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THE LENGTH, AGE, AND SEX RATIO OF CHUM SALMON IN THE ALASKA PENINSULA, KODIAK ISLAND, AND PRINCE WILLIAM SOUND AREAS OF ALASKA

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by

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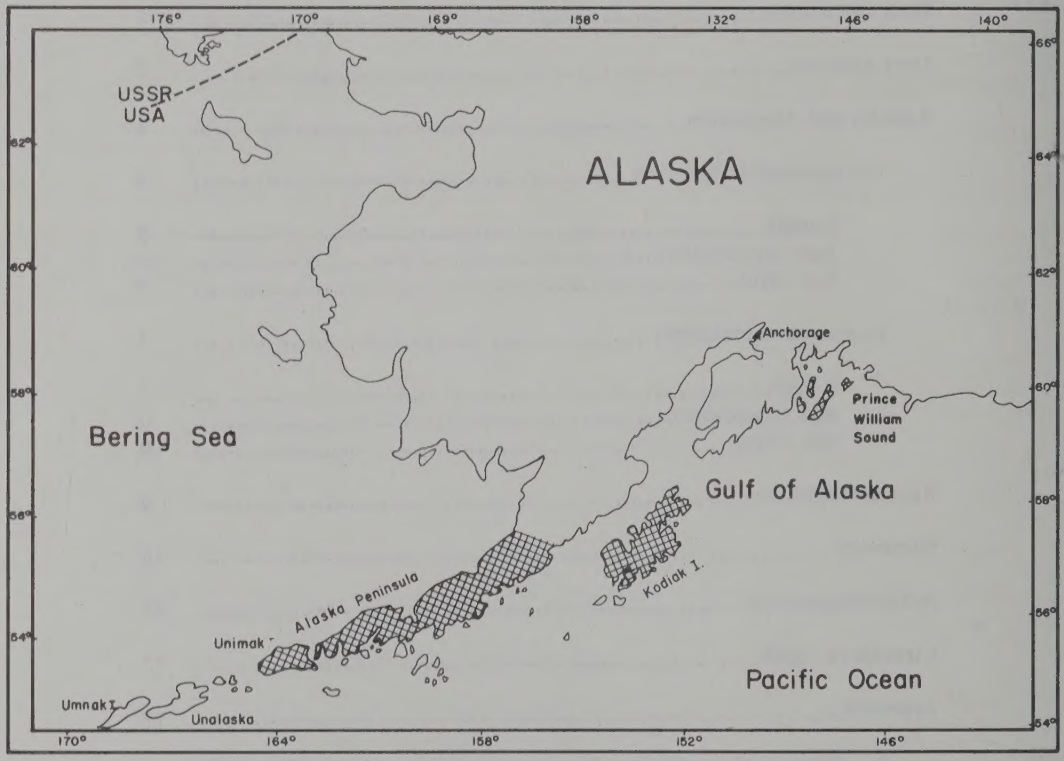

Figure 1.--Western Alaska. Data on chum salmon were collected in three cross-hatched areas from 1948 through 1958.

THE LENGTH, AGE, AND SEX RATIO OF CHUM SALMON IN THE ALASKA PENINSULA, KODIAK ISLAND, AND PRINCE WILLIAM SOUNDS AREAS OF ALASKA

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ABSTRACT

Data on length, age, and sex ratio of chum salmon from the Alaska Peninsula area from 1951 through 1957, the Kodiak Island area from 1948 through 1951 and 1955 through 1957, and the Prince William Sound area from 1952 through 1958 show that age and length composition in these areas varied in a similar manner. Lengths of fish in the 3-, 4-, and 5-year age classes overlapped to such an extent that length was not a useful guide to age. The average age composition for the combined samples was about 10 percent 3-year-olds, 75 percent 4-year-olds, and 15 percent 5-year-olds. Mean age decreased as the season advanced. The percentage of males decreased slightly as the runs progressed.

INTRODUCTION

Chum salmon *(Oncorhynchus keta)* rank third in abundance and value in Alaska's salmon fisheries. Despite their importance, little research has been done on this species.

The Fisheries Research Institute (FRI), College of Fisheries, University of Washington, collected data on the length, age, and sex ratio of chum salmon incidental to research on other species of salmon in the Alaska Peninsula, Kodiak Island, and Prince William Sound areas between 1948 and 1958 (fig. 1). No planned program for sampling chum salmon was organized, but data were taken when chum salmon were available and when the time required for processing them did not conflict with other studies. Because of time limitations, the material was not analyzed at the end of each year, and changes in sampling techniques that might be expected to follow such analyses were not made. As a result, the data presented here are not complete or continuous, and no comprehensive analysis of the chum salmon runs to the three areas for the years when sampling was conducted is made. In spite of its limitations, this material has importance because it is the only biological information concerning past chum salmon runs in the three areas.

The objectives of this paper are to (1) present basic material collected during the several years; (2) draw tentative conclusions as to intraseasonal and interarea variability in length, age, and sex ratio; and (3) recommend methods of sampling for future studies.

Note.--Thorsteinson presently with Bureau of Commercial Fisheries, Juneau, Alaska; Noerenberg with Alaska Department of Fish and Game, Cordova, Alaska; and Smith with Fisheries Research Board of Canada, Nanaimo, B.C.

The data discussed are from the commercial catch and the spawning grounds in the areas and years as follows:

1. Alaska Peninsula commercial catch, 1951-57.

2. Kodiak Island commercial catch, 1948-51 and 1955-57.

3. Prince William Sound commercial catch, 1952-53 and 1956-58, and spawning grounds, 1952-57.

DATA COLLECTION

The commercial catch samples were obtained chiefly at salmon canneries, but a small number were taken on the Prince William Sound fishing grounds during tagging operations. The spawning ground samples were collected during stream surveys and tag recovery programs in Prince William Sound.

Fish sampled at the canneries were caught by traps, purse and beach seines, and gill nets. The gear type was recorded, since certain types, particularly gill nets, were probably selective for size of fish and for sex.

The length from mideye to fork of tail was determined in millimeters by one of two instruments devised by the Institute's staff for measuring salmon in the field. These are described by Duncan[1] and Thompson.[2] Both machines give a straight line measurement and avoid much of the bias inherent in simple tape measurements.

For salmon taken on the spawning grounds the mideye-fork measurement had to be replaced by a mideye to hypural plate measurement because of eroded caudal fins on many of the fish. All measurements were converted to mideye-fork length by the formula

$$Y = 1.1048\ X - 1.1052$$

where Y is the mideye-fork measurement and X the hypural plate measurement. The formula was calculated from paired measurements obtained from 228 chum salmon taken in traps on the Alaska Peninsula from June 20 to July 30, 1951.

Scales for age determination were taken from at least 20 percent of the fish measured in each sample. In small samples, proportionately more scales were taken.

Sex ratios were obtained from counts of fish as they passed along the cannery conveyor belts, or from piles of fish in the cannery bins. The number of fish used in determining sex ratios was usually more than the number measured for length. Fish in small deliveries were frequently canned before a large sample could be obtained.

DATA ANALYSIS

Data on length, age, and sex ratio were arranged by date and locality of catch.

Length measurements, recorded to the nearest millimeter in the field, were grouped in 1-cm. intervals. Some workers began their groups with even centimeters, e.g., 570 mm.; others began them 1 mm. larger, e.g., 571 mm. Since the corresponding centimeter groups would be 570-579 and 571-580, the midpoints 574.5 and 575 fell one-half millimeter apart. This minor discrepancy was not considered in analyzing the data.

To determine age, plastic impressions suitable for microprojection were made from scales that were mounted sculptured side out on gummed cards. The procedure is outlined by Koo (in press). Most of the scales were read by Thorsteinson and Noerenberg, but a few were read by Smith and other members of the FRI staff. Agreement in scale interpretation was tested by an independent reading of a set of 200 scales by each author. Eight scales were regenerated and judged unreadable by each reader. Some disagreement existed in interpreting the scales; 15 (7.5 percent) were read as different ages by one or more readers. In view of the difficulty in establishing the position of chum salmon scale annuli (Henry, 1953), this disagreement may not be excessive. It does suggest a need for standardizing methods of interpreting chum salmon scales and investigating patterns of scales from fish of known ages.

[1] Duncan, Rea E. 1956. Two measures of the length of red salmon, *Oncorhynchus nerka* (Walbaum), their relation and application in the study of the catch and escapement in Bristol Bay, Alaska. M.S. Thesis, University of Washington, Seattle, 92 p.

[2] Thompson, William F. Report in preparation at Fisheries Research Institute.

Sex ratios were calculated as percentages.

The data, set up in standardized format, are arranged to provide the original material for analysis and reference in this report as appendixes A, B, and C. They are organized as follows:

1. A chronological tabulation of scale samples, giving each a number for convenient reference and showing the date, location of sample, gear used, and number of measurements and scale samples obtained (appendix tables A-1, B-1, C-1, C-2).

2. A map of each area showing localities where samples were taken (appendix figures A-1, B-1, C-1, C-2).

3. A frequency tabulation to the nearest half centimeter midpoint for all lengths having corresponding ages by age and sex. All fish less than 500 mm. and more than 749 mm. are grouped, because they make up insignificant numbers of the total (appendix tables A-2, B-2, C-3, C-4).

4. The sex ratio of all samples (appendix tables A-3, B-3, C-5, C-6).

In the Prince William Sound area, streams where spawning ground samples were taken are designated according to the time of their runs--early, middle, or late. Noerenberg classifies Prince William Sound streams as follows: early runs peak between July 15 and August 5, middle runs between August 6 and 20, and late runs between August 21 and September 10.[3]

Since sampling was not complete or continuous for any one year or series of years, the general relationships of length with age were studied by combining all length measurements by age classes for each area irrespective of the year, time of season, or source of the sample. In using the combined yearly data, two points were considered: types of gear used and the treatment of the spawning ground samples from Prince William Sound.

Gill nets are usually considered to be selective for size and sex. In our samples from gill nets, ages and lengths were distributed within about the same limits as in samples from traps and seines, and separating the data by type of gear did not appear justified. Usable data from the Prince William Sound commercial catch and spawning grounds were obtained in only 3 years. The mean lengths of 4-year-olds (table 1), the dominant age class, were similar; and no directional bias was evident between catch and spawning ground samples. Because of the similarity in lengths, all of the samples from Prince William Sound were used for comparisons with other areas, even though in some years samples were exclusively from the commercial catch and in some, exclusively from the spawning grounds.

In contrast to the similarity in length, the age compositions of samples from the catch and spawning grounds were not sufficiently alike to permit grouping. In table 2 age composition samples for 1952, 1953, and 1956 are combined by sex. The percentage of 3-year-olds in the catch is about three times that on the spawning grounds, and the percentage of 5-year-olds in the catch about half that on the spawning grounds. This approximate relationship prevailed in all 3 years having comparable data (appendix tables C-3 and C-4).

Changes in length composition were studied through the mean lengths of 4-year-old fish, grouped according to sex. Only 4-year-olds, the dominant age class, were studied, since changes in mean lengths of 3- and 5-year-olds varied in the same way as 4-year-olds. Changes in age composition were studied as numbers and percentages of fish occurring in the three age groups. Sex ratios were determined from entire samples.

[3] Noerenberg, W. H. 1954. Prince William Sound spawning ground survey, 1954. University of Washington, Fisheries Research Institute, Circular No. 69, 19 p. [Duplicated.]

Table 1.--Mean lengths of 4-year-old chum salmon from Prince William Sound commercial catch and spawning ground samples, 1952, 1953, and 1956

Year	Males				Females			
	Commercial catch		Spawning grounds		Commercial catch		Spawning grounds	
	Number	Length	Number	Length	Number	Length	Number	Length
		Mm.		Mm.		Mm.		Mm.
1952	158	652	128	632	212	637	152	629
1953	351	622	683	634	424	620	572	617
1956	424	605	393	601	433	598	471	598
Mean		626		618		618		615

Table 2.--Age composition of 3-, 4-, and 5-year-old chum salmon in Prince William Sound catch and spawning ground samples, 1952, 1953, and 1956 combined

Sex and source	Age in years					
	3		4		5	
	Number	Percent	Number	Percent	Number	Percent
Males						
Commercial catch	88	26.0	227	67.0	24	7.0
Spawning grounds	43	8.7	367	74.3	84	17.0
Females						
Commercial catch	39	11.5	275	81.4	24	7.1
Spawning grounds	11	2.4	377	83.4	64	14.2

RESULTS AND DISCUSSION

More than 10,000 age-length determinations were made for chum salmon from the three areas. Age class 6 has not been considered in this paper because it occurs infrequently. The greatest number found in our samples amounted to 0.05 percent in the Kodiak Island area.

The most striking feature of the age-length relationship was the great overlap in the length distributions of fish in three age classes (fig. 2). Three- and five-year-old chum salmon overlapped through almost half their ranges, and 4-year-olds overlapped almost the entire range of the other two age groups. It is clear from figure 2 that length cannot be used as a reliable guide to age, or vice versa, in Alaska chum salmon.

Since there was no dependable relationship between length and age in any area, they are treated separately in the discussions of variability within seasons and between areas.

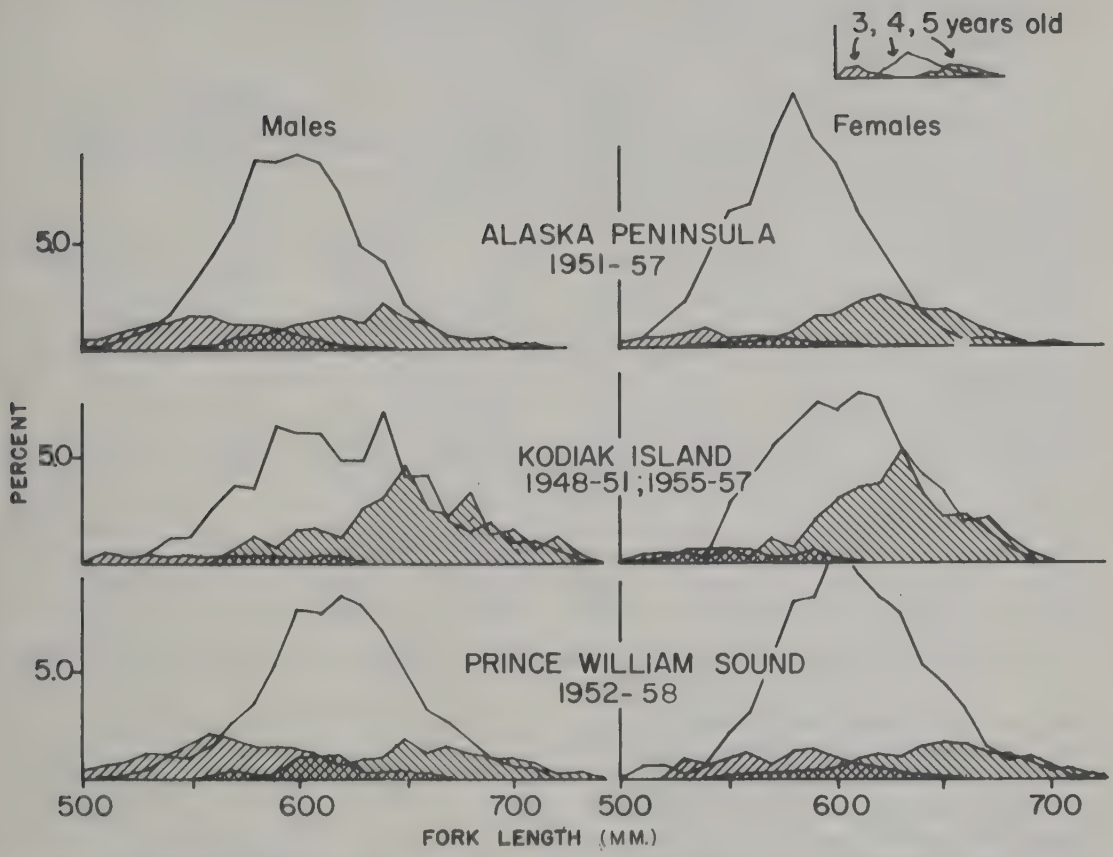

Figure 2.--Age-length relationships of 3-, 4-, and 5-year-old chum salmon in the Alaska Peninsula, Kodiak Island, and Prince William Sound areas of Alaska.

Intraseasonal Variation

To compare the runs of the Alaska Peninsula, Kodiak Island, and Prince William Sound areas intraseasonally, fishing seasons were divided arbitrarily into three periods--before July 1, between July 1 and 15, and after July 15.

In the division by time, we assumed that fish caught before July 1 on the Alaska Peninsula (except those taken at Chignik) were bound for areas other than the Peninsula. Chum salmon are captured simultaneously with pink and red salmon in the Peninsula fishery during June. Tagging experiments (Gilbert and Rich, 1927; Thorsteinson, 1959) showed that red and pink salmon taken at that time of the season were bound for other areas. Since it is possible that early chum salmon are also bound for other areas, we felt that the data for the three periods should be kept separate.

Length.--The mean lengths and standard deviations of combined yearly samples of age class 4 from each area are shown by the three time periods in table 3. To avoid bias in years when runs of exceptionally large or exceptionally small fish were not sampled in all time periods, the data are combined for only those years when three periods were represented in the Alaska Peninsula area and two in the Kodiak Island and Prince William Sound areas.

Table 3.--Variability in size of 4-year-old chum salmon in three time periods in catch, Alaska Peninsula, 1951, 1953-57; Kodiak Island, 1949, 1955-57; Prince William Sound, 1953, 1956, 1958

Area and time period	Males			Females		
	Number	Average length	Standard deviation	Number	Average length	Standard deviation
		Mm.			Mm.	
Alaska Peninsula						
Before July 1	665	600	29.0	677	570	25.8
July 1-15	676	605	32.8	661	589	27.5
After July 15	568	598	32.9	613	587	26.3
Kodiak Island						
Before July 1	---	---	---	---	---	---
July 1-15	144	616	39.0	133	605	28.9
After July 15	227	635	38.7	234	611	33.7
Prince William Sound						
Before July 1	---	---	---	---	---	---
July 1-15	84	618	37.0	89	598	32.5
After July 15	169	617	30.6	208	608	29.3

Mean lengths of chum salmon of both sexes in age class 4 were slightly greater in the third period in the Kodiak Island area. Means were similar in all three periods on the Peninsula--for males the range was only 7 mm. The means showed no appreciable change with time of sampling in Prince William Sound.

Age composition.--Age composition of the combined samples for all of the years is given by the three time periods in table 4 and shown graphically in figure 3. The data are so few in the first period for the Kodiak Island and Prince William Sound areas that only males from the Kodiak Island area are plotted in the figure. The age composition shifted with time: 3-year-old fish increased and 5-year-old fish decreased in relative abundance as the season progressed. Four-year-olds were dominant throughout the season and made up about three-fourths of the total run. This trend toward younger fish as the season advanced is not an artifact of combining the data. Catch data from the East Anchor Cove-Ikatan Bay and Izembek Bay areas of the Alaska Peninsula show the same sequence of shift in ages (table 5).

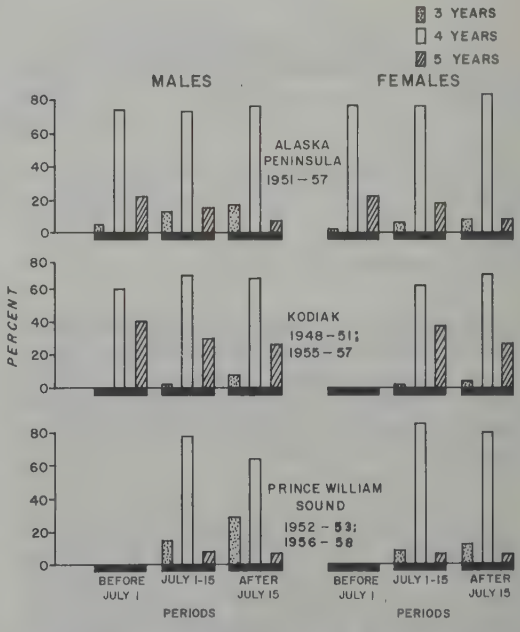

Figure 3.--Percentage 3-, 4-, and 5-year-old chum salmon in three time periods in the catch in Alaska Peninsula, Kodiak Island, and Prince William Sound areas.

Table 4.--Number and Percentage of 3-,4-, and 5-year-old chum salmon in three time periods in catch, Alaska Peninsula, 1951-57; Kodiak Island, 1948-51, 1955-57; Prince William Sound, 1952-53, 1956-58

Area, sex, and time period	Age in years					
	3		4		5	
	Number	Percent	Number	Percent	Number	Percent
Alaska Peninsula						
Males						
Before July 1	62	5.3	874	74.2	242	20.5
July 1-15	116	12.5	676	72.9	135	14.6
After July 15	140	17.2	618	75.8	57	7.0
Females						
Before July 1	15	1.3	857	77.0	242	21.7
July 1-15	49	5.6	662	75.8	162	18.6
After July 15	58	7.0	698	84.9	67	8.1
Kodiak Island						
Males						
Before July 1	0	0	6	60.0	4	40.0
July 1-15	3	1.4	144	68.3	64	30.3
After July 15	54	7.9	455	66.5	175	25.6
Females						
Before July 1	0	0	5	100.0	0	0
July 1-15	1	0.5	133	62.7	78	36.8
After July 15	24	3.8	436	69.1	171	27.1
Prince William Sound						
Males						
Before July 1	---	---	---	---	---	---
July 1-15	17	15.4	84	76.4	9	8.2
After July 15	93	28.8	206	63.8	24	7.4
Females						
Before July 1	0	0	4	100.0	0	0
July 1-15	9	8.6	89	84.7	7	6.7
After July 15	40	12.8	251	80.2	22	7.0

This same situation is paralleled on the Prince William Sound spawning grounds. Helle (1960)[4] compared early and late spawning runs and found that in both, fish in age class 5 were most abundant in the initial stages of the runs, and fish in age class 3 became more abundant as the season of the runs advanced.

[4] Helle, John Harold. 1960. Characteristics and structure of early and late spawning runs of chum salmon, *Oncorhynchus keta* (Walbaum), in streams of Prince William Sound, Alaska. M.S. Thesis, University of Idaho, 53 p.

Sex ratio.--The sex ratio is shown by time periods in table 6. It was in favor of males early in the season and decreased slightly as the season progressed. The situation was the same in all three areas, although data taken before July 1 in the Kodiak Island and Prince William Sound areas are too few to be dependable.

Interarea Variability

Length.--In figure 4 the mean lengths of age classes 3, 4, and 5 are plotted by area to permit an evaluation of length with age. The

Table 5.--Number and percentage of 3-, 4-, and 5-year-old chum salmon in three time periods in catch, East Anchor Cove-Ikatan Bay, 1951, 1952-57; Izembek Bay, 1955-57

Area, sex, and time period	Age in years					
	3		4		5	
	Number	Percent	Number	Percent	Number	Percent
East Anchor Cove-Ikatan Bay						
Males						
Before July 1	32	8.3	278	72.4	74	19.3
July 1-15	88	24.0	233	63.5	46	12.5
After July 15	15	26.8	34	60.7	7	12.5
Females						
Before July 1	7	2.1	282	83.2	50	14.7
July 1-15	35	11.4	216	70.4	56	18.2
After July 15	8	15.4	42	80.8	2	3.8
Izembek Bay						
Males						
Before July 1	1	1.8	53	94.6	2	3.6
July 1-15	10	3.1	278	85.8	36	11.1
After July 15	31	8.4	315	84.9	25	6.7
Females						
Before July 1	0	0	48	88.9	6	11.1
July 1-15	8	2.4	279	85.4	40	12.2
After July 15	10	2.6	343	90.3	27	7.1

Table 6.--Sex ratio of chum salmon in three time periods, Alaska Peninsula, 1951-57; Kodiak Island, 1948-51, 1955-57; Prince William Sound, 1952-58

Area and time period	Males		Females	
	Number	Percent	Number	Percent
Alaska Peninsula				
Before July 1	1,634	53.0	1,446	47.0
July 1-15	2,392	53.0	2,081	47.0
After July 15	2,446	52.0	2,255	48.0
Kodiak Island				
Before July 1	70	70.0	30	30.0
July 1-15	400	52.0	373	48.0
After July 15	1,415	49.0	1,462	51.0
Prince William Sound				
Before July 1	5	---	4	---
July 1-15	416	49.0	427	51.0
After July 15	1,025	45.0	1,252	55.0

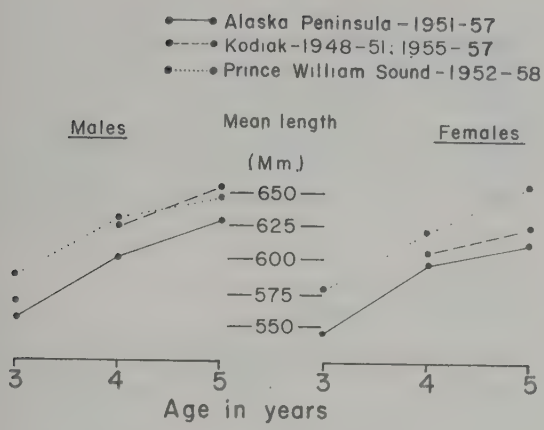

Figure 4.--Mean lengths of chum salmon in Alaska Peninsula, Kodiak Island, and Prince William Sound areas by age and sex (points are unweighted means).

points are unweighted means calculated from table 7. The figure shows that despite the inconsistency of the sources of the yearly data, the basic relationships of size with age prevailed in all areas. Age class 3 females from the Kodiak Island area were too few to use. Mean lengths increased from west to east: Alaska Peninsula chum salmon were smallest and Prince William Sound chum salmon largest.

In table 7 the numbers of fish in each age class, average lengths, and standard deviations for each sample are shown for the three areas for the years 1948-58. Age classes containing fewer than 10 fish were not used in the calculations.

Lengths in each age class varied little from one year to the next, the greatest variation occurring in males in age class 4 from the Kodiak Island area; in 1955 males were 70 mm. (almost 3 inches) larger than those in 1948. In any year fish of the same age class tended to be relatively the same length. Even though fish of different ages were exposed to different growing conditions during their life in the ocean, they all tended to be relatively large or relatively small at maturity. For example, in 1952 average lengths were greater than the long-term mean, and in 1956, except for females in age class 4 in the Kodiak Island area, they were smaller.

Age composition.--The age composition of samples combined by years for each area is shown in table 8. All age data are grouped to give an average value for age composition of chum salmon in the general region under consideration. Age class structure of chum salmon of the central and western part of Alaska averaged about 10 percent 3-year-olds, 75 percent 4-year-olds, and 15 percent 5-year-olds. The percentages were fairly consistent from year to year.

Age composition for the Kodiak Island area varied from that for the Alaska Peninsula and Prince William Sound areas. In the Kodiak Island area about 27 percent of the fish in the samples were in age class 5, which was about twice the percentage of age class 5 fish in the other two areas. Fish in age class 3, on the other hand, formed a greater proportion of the Prince William Sound and Alaska Peninsula runs than they did of the Kodiak Island area runs. When year-to-year changes were inspected with regard to the long-term mean age composition, it appeared that all three areas tended to vary in the same direction at the same time. For instance, in the Alaska Peninsula and Prince William Sound areas, low percentages of 4-year-olds were found in 1952. In 1956 in all three areas, high percentages of 4-year-olds were taken.

Sex ratio.--Sex ratio by area and by year are given in appendix tables A-3, B-3, C-5, and C-6. Differences in the percentage of males from place to place were negligible.

RECOMMENDATIONS

During the analysis we found that because of the inconsistency of collecting data by locality of sampling, season of the fishery, or stage of the spawning migrations, only general conclusions could be drawn about chum salmon in the various areas. More precise estimates of parameters of length, age composition, and sex ratio, as well as other biological statistics, are needed. With reference to the characters measured during this study, we recommend the following for future work:

1. Since the age composition in the fishery and the spawning migration does change during the season, samples should be taken from both at regular and frequent intervals.

2. If a program is to continue over a period of more than 1 year, sampling should be done in the same localities and the same time periods each year.

3. Larger scale samples than are customarily taken for determining age in other species of salmon are required.

4. To eliminate the task of converting length measurements, a single measurement, such as mideye to hypural plate, should be taken in both fresh- and salt-water samples.

5. In view of the difficulty in interpreting age from chum salmon scales, the problem should be reviewed and methods standardized.

Table 7.--Length statistics of chum salmon from Alaska Peninsula, Kodiak Island, and Prince William Sound areas

Area, year, and age of fish (years)	Males			Females		
	Number	Average length	Standard deviation	Number	Average length	Standard deviation
		Mm.			Mm.	
Alaska Peninsula						
1951						
3	14	550	29.6	7	---	---
4	44	589	35.2	43	582	34.3
5	16	633	35.8	20	592	29.2
1952						
3	56	564	37.6	20	557	26.5
4	50	612	39.3	85	599	30.1
5	8	---	---	11	625	28.4
1953						
3	55	581	35.6	48	581	34.8
4	184	607	34.6	192	581	31.7
5	34	631	35.9	38	605	35.1
1954						
3	183	567	28.7	45	550	24.6
4	840	611	32.7	845	597	30.7
5	225	640	36.4	265	627	27.4
1955						
3	30	536	24.7	10	530	24.8
4	224	604	30.1	238	582	27.3
5	28	630	35.8	31	609	23.0
1956						
3	41	546	27.7	19	540	22.0
4	716	592	26.8	737	578	24.2
5	35	624	23.6	31	603	24.9
1957						
3	28	558	25.1	14	533	21.2
4	205	605	32.8	213	584	27.0
5	106	624	28.7	101	607	30.7
Unweighted average length (all years)						
3		557.4			548.5	
4		602.9			586.0	
5		630.3			609.7	

Table 7.--Length statistics of chum salmon from Alaska Peninsula, Kodiak Island, and Prince William Sound areas--continued

Area, year, and age of fish (years)	Males			Females		
	Number	Average length	Standard deviation	Number	Average length	Standard deviation
		Mm.			Mm.	
Kodiak Island						
1948						
3	14	571	38.5	8	---	---
4	63	596	32.1	69	594	29.0
5	36	647	37.0	42	622	36.4
1949						
3	2	---	---	3	---	---
4	99	603	31.2	110	588	30.4
5	62	631	36.5	40	609	27.0
1950						
3	1	---	---	2	---	---
4	38	617	35.1	37	598	28.6
5	18	652	31.0	17	628	14.5
1951						
3	1	---	---	1	---	---
4	11	651	36.8	4	---	---
5	7	---	---	11	615	26.9
1955						
3	4	---	---	0	---	---
4	81	666	35.4	86	634	26.1
5	61	681	28.4	82	648	24.9
1956						
3	1	---	---	1	---	---
4	33	612	30.6	33	610	24.0
5	4	---	---	3	---	---
1957						
3	6	---	---	0	---	---
4	120	630	32.9	101	614	25.3
5	24	663	29.4	32	623	28.0
Unweighted average length (all years)						
3		571			---	
4		625.0			606.3	
5		654.8			624.2	

Table 7.--Length statistics of chum salmon from Alaska Peninsula, Kodiak Island, and Prince William Sound areas--continued

Area, year, and age of fish (years)	Males			Females		
	Number	Average length	Standard deviation	Number	Average length	Standard deviation
		Mm.			Mm.	
Prince William Sound						
1952						
3	27	606	20.9	17	593	16.4
4	47	644	27.3	41	634	28.0
5	22	681	23.4	32	669	27.9
1953						
3	50	565	32.1	19	581	23.7
4	300	634	32.6	325	618	28.4
5	74	653	33.8	50	651	27.5
1954						
3	29	569	29.5	15	575	21.2
4	20	647	39.2	25	625	40.4
5	7	---	---	3	---	---
1955						
3	4	---	---	2	---	---
4	22	638	36.1	23	629	22.3
5	2	---	---	2	---	---
1956						
3	53	564	31.6	14	573	25.5
4	245	601	29.9	288	598	29.9
5	11	633	42.8	5	---	---
1957						
3	12	623	40.6	3	---	---
4	77	625	30.3	80	623	42.3
5	20	628	31.8	24	647	33.4
1958						
3	14	597	26.6	8	---	---
4	54	629	30.4	53	612	30.7
5	7	---	---	4	---	---
Unweighted average length (all years)						
3		587.3			580.5	
4		631.1			619.9	
5		648.8			655.7	

Table 8.--Age composition of chum salmon from Alaska Peninsula, Kodiak Island, and Prince William Sound areas

Area, year, and age of fish (years)	Males		Females	
	Number	Percent	Number	Percent
Alaska Peninsula				
1951				
3	14	18.9	7	10.0
4	44	59.5	43	61.4
5	16	21.6	20	28.6
Total	74		70	
1952				
3	58	50.0	20	17.2
4	50	43.1	85	73.3
5	8	6.9	11	9.5
Total	116		116	
1953				
3	55	20.1	50	17.8
4	184	67.4	193	68.7
5	34	12.5	38	13.5
Total	273		281	
1954				
3	183	14.7	45	3.9
4	840	67.3	845	73.2
5	225	18.0	265	22.9
Total	1,248		1,155	
1955				
3	30	10.6	10	3.6
4	224	79.4	238	85.3
5	28	9.9	31	11.1
Total	282		279	
1956				
3	41	5.2	19	2.5
4	716	90.4	737	93.6
5	35	4.4	31	3.9
Total	792		787	
1957				
3	28	8.3	14	4.3
4	205	60.5	213	64.9
5	106	31.2	101	30.8
Total	339		328	
All years				
3	409	13.1	165	5.5
4	2,263	72.4	2,354	78.0
5	452	14.5	497	16.5
Total	3,124		3,016	

Table 8.--Age composition of chum salmon from Alaska Peninsula, Kodiak Island, and Prince William Sound areas--continued

Area, year, and age of fish (years)	Males		Females	
	Number	Percent	Number	Percent
Kodiak Island				
1948				
3	15	13.1	8	6.7
4	63	55.3	69	58.0
5	36	31.6	42	35.3
Total	114		119	
1949				
3	4	2.4	4	2.6
4	99	60.0	110	71.4
5	62	37.6	40	26.0
Total	165		154	
1950				
3	1	1.7	2	3.6
4	38	66.7	37	66.1
5	18	31.6	17	30.3
Total	57		56	
1951				
3	1	5.3	1	6.3
4	11	57.9	4	25.0
5	7	36.8	11	68.7
Total	19		16	
1955				
3	4	2.7	0	0
4	81	55.5	86	51.2
5	61	41.8	82	48.8
Total	146		168	
1956				
3	1	2.6	1	2.7
4	33	86.8	33	89.2
5	4	10.5	3	8.1
Total	38		37	
1957				
3	31	8.5	9	3.0
4	280	76.5	235	78.9
5	55	15.0	54	18.1
Total	366		298	
All years				
3	57	6.3	25	2.9
4	605	66.9	574	67.7
5	243	26.8	249	29.4
Total	905		848	

Table 8.--Age composition of chum salmon from Alaska Peninsula, Kodiak Island, and Prince William Sound areas--continued

Area, year, and age of fish (years)	Males		Females	
	Number	Percent	Number	Percent
Prince William Sound				
1952				
3	27	27.8	17	18.9
4	47	48.5	41	45.6
5	23	23.7	32	35.5
Total	97		90	
1953				
3	50	11.7	19	4.9
4	302	70.9	324	82.4
5	74	17.4	50	12.7
Total	426		393	
1954				
3	30	52.6	15	34.9
4	20	35.1	25	58.1
5	7	12.3	3	7.0
Total	57		43	
1955				
3	4	14.3	2	7.4
4	22	78.6	23	85.2
5	2	7.1	2	7.4
Total	28		27	
1956				
3	54	17.4	14	4.6
4	245	79.1	287	93.5
5	11	3.5	6	1.9
Total	310		307	
1957				
3	12	10.8	3	2.8
4	77	69.4	80	74.8
5	22	19.8	24	22.4
Total	111		107	
1958				
3	14	18.4	8	12.3
4	55	72.4	53	81.5
5	7	9.2	4	6.2
Total	76		65	
All years				
3	191	17.2	78	7.6
4	768	69.5	833	80.7
5	146	13.2	121	11.7
Total	1,105		1,032	
All areas and years				
3	657	12.8	268	5.5
4	3,636	70.8	3,761	76.8
5	841	16.4	867	17.7
Total	5,134		4,896	

SUMMARY

Data on length, age, and sex ratio of chum salmon were collected between 1948 and 1958 in the Alaska Peninsula, Kodiak Island, and Prince William Sound areas of Alaska. The data are not complete or continuous, as no formal program for sampling was organized. Material was collected according to the time available to biologists working in the areas and the availability of the fish. The data are the only biological information (except for catch statistics) for past runs of this species in the three areas, and as such represent an important source of historical and reference material. They are therefore included as an appendix to this report.

Analyses were performed by grouping the data by years, by area, and by time periods within years. The data permit only general statements concerning the chum salmon runs to three areas, but do provide a measure of the intraseasonal and interarea variability in length, age, and sex ratio.

The analyses are summarized as follows:

1. Length distributions of chum salmon in the three principal age classes overlapped considerably. Three- and five-year-old length distributions overlapped by 50 percent, and age class 4 overlapped almost the entire range of the adjoining two age classes. Consequently, length is not a useful guide to age in these areas, and vice versa.

2. Little difference was found in the mean size of chum salmon of the same age class either among the three areas or during the spawning season. Prince William Sound fish were largest. Mean lengths increased from west to east.

3. Age class structure of the chum salmon runs of the central and western regions of Alaska averaged about 10 percent 3-year-olds, 75 percent 4-year-olds, and 15 percent 5-year-olds.

4. Age composition is similar in the Alaska Peninsula and Prince William Sound areas, but somewhat different in the Kodiak Island area. Kodiak Island has significantly more 5-year-old fish and fewer 3-year-old fish than the other two areas.

5. Age composition of the runs changes within seasons in all three areas. As the season progresses, 3-year-olds increase and 5-year-olds decrease. The percentage of fish in age class 4 remains fairly constant throughout the season.

6. Sex ratios do not deviate markedly from 50:50, either by area or in time. The trend is toward fewer males as the season progresses.

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Salmon packers who assisted in the three areas were:

Alaska Peninsula area:
- P. E. Harris Co., Inc.
- Pacific American Fisheries, Inc.
- Alaska Pacific Salmon Co.
- Alaska Packers Association
- Chignik Fisheries Co.

Kodiak Island area:
- Alaska Packers Association
- San Juan Fishing and Packing Co.
- Kodiak Fisheries Co.
- Pacific American Fisheries, Inc.
- Parks Canning Co.
- Libby, McNeill and Libby
- Washington Fish and Oyster Co.
- West Point Canning Co.
- Halferty Canneries, Inc.
- King Crab, Inc.

Prince William Sound area:
- Halferty Canneries, Inc.
- New England Fish Co.
- San Juan Fishing and Packing Co.
- Copper River Co-op, Inc.

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APPENDIX

A. Biological Statistics for Chum Salmon, Alaska Peninsula area, 1951-57

Table A-1. --Particulars of measurements and scale samples of chum salmon taken in Alaska Peninsula commercial catch, 1951-57
(BS = Beach Seine, PS = Purse Seine, T = Trap, GN = Gill Net)

Date	Sample number and location	Gear used	Number of measurements			Number of scales		
			Male	Female	Total	Male	Female	Total
1951								
June 20	1 - Cape Lutke	PS	87	96	183	8	8	16
July 10 and 14	2 - East Anchor Cove-Ikatan Bay	T	215	242	457	30	30	60
July 17 and 20	3 - East Anchor Cove-Ikatan Bay	T	157	201	358	17	16	33
July 27-30	4 - Shumagin Islands	T	308	245	553	19	16	35
Total			767	784	1,551	74	70	144
1952								
July 19	5 - Shumagin Islands	T	44	40	84	18	20	38
July 21	6 - Shumagin Islands	T	115	114	229	38	38	76
July 22	7 - Shumagin Islands	T	67	53	120	23	19	42
July 24	8 - Shumagin Islands	T	52	47	99	20	19	39
July 25	9 - Shumagin Islands	T	67	48	115	17	20	37
Total			345	302	647	116	116	232
1953								
June 8-14	10 - Cape Lutke	PS	98	101	199	19	20	39
June 15 and 17	11 - Cape Lutke	PS	38	35	73	20	24	44
June 20	12 - Cape Lutke	PS	66	60	126	19	17	36
June 20	13 - East Anchor Cove-Ikatan Bay	T	81	73	154	16	19	35
June 22	14 - East Anchor Cove-Ikatan Bay	T	67	61	128	15	18	33
June 29-30	15 - Chignik Bay	BS and T	319	172	491	32	34	66
June 30	16 - East Anchor Cove-Ikatan Bay	T	121	114	235	20	16	36
July 2	17 - East Anchor Cove-Ikatan Bay	T	108	102	210	18	18	36
July 7 and 10	18 - Shumagin Islands	T	246	215	461	38	37	75
July 17	19 - Shumagin Islands	T	117	121	238	19	20	39

Table A-1. --Particulars of measurements and scale samples of chum salmon taken in Alaska Peninsula commercial catch, 1951-57 -- Continued
(BS = Beach Seine, PS = Purse Seine, T = Trap, GN = Gill Net)

Date	Sample number and location	Gear used	Number of measurements			Number of scales		
			Male	Female	Total	Male	Female	Total
1953 continued								
July 21	20 - Shumagin Islands	T	116	87	203	18	20	38
July 24	21 - Shumagin Islands	T	122	100	222	20	19	39
July 27	22 - Shumagin Islands	T	115	121	236	19	19	38
Total			1,614	1,362	2,976	273	281	554
1954								
June 10-20	23 - Cape Lutke	PS	226	240	466	205	212	417
June 18	24 - Kujulik Bay	BS	41	41	82	36	37	73
June 18-22	25 - East Anchor Cove-Ikatan Bay	T	161	141	302	154	133	287
June 22	26 - Kujulik Bay	BS	79	69	148	78	67	145
June 23-24	27 - Chignik Lagoon	BS	50	40	90	48	41	89
June 25-27	28 - Chignik Lagoon	BS	60	60	120	60	56	116
June 27	29 - Chignik Bay	T	60	58	118	52	46	98
June 30	30 - Kujulik Bay	BS	40	40	80	36	38	74
July 5-9	31 - East Anchor Cove-Ikatan Bay	T	180	115	295	171	113	284
July 7	32 - Aniakchak Bay	BS	46	44	90	34	41	75
July 9-10	33 - Herendeen Bay	BS	97	98	195	145	145	290
July 14	34 - Herendeen Bay	BS	20	20	40	19	16	35
July 15	35 - Bear River	GN	19	21	40	19	20	39
July 16	36 - Moller Bay	GN	14	13	27	14	12	26
July 16	37 - Bear River	GN	80	74	154	74	70	144
July 16	38 - Nelson Lagoon	GN	8	12	20	8	12	20
July 19	39 - Bear River	GN	20	20	40	18	20	38
July 24	40 - Herendeen Bay	BS	47	40	87	38	38	76
July 25	41 - Nelson Lagoon	GN	20	20	40	20	20	40
July 28	42 - Nelson Lagoon	GN	19	21	40	19	18	37
Total			1,287	1,187	2,474	1,248	1,155	2,403

Table A-1. --Particulars of measurements and scale samples of chum salmon taken in Alaska Peninsula commercial catch, 1951-57 -- Continued
(BS = Beach Seine, PS = Purse Seine, T = Trap, GN = Gill Net)

Date	Sample number and location	Gear used	Number of measurements			Number of scales		
			Male	Female	Total	Male	Female	Total
1955								
June 14-18	43 - Cape Lutke	PS	50	36	86	23	18	41
June 17-21	44 - East Anchor Cove-Ikatan Bay	T	39	44	83	26	21	47
June 26	45 - East Anchor Cove-Ikatan Bay	T	16	10	26	10	8	18
June 29	46 - East Anchor Cove-Ikatan Bay	T	13	15	28	15	13	28
July 1	47 - Izembek Bay	BS	37	35	72	20	18	38
July 5	48 - Izembek Bay	BS	54	26	80	18	19	37
July 7	49 - Izembek Bay	BS	21	29	50	19	20	39
July 9	50 - Izembek Bay	BS	13	22	35	13	20	33
July 12	51 - Izembek Bay	BS	51	50	101	20	18	38
July 13	52 - Izembek Bay	BS	44	46	90	19	19	38
July 13	53 - East Anchor Cove-Ikatan Bay	T	0	0	0	8	8	16
July 16-20	54 - Izembek Bay	BS	144	143	287	49	49	98
July 17	55 - Pavlof Bay	T	28	22	50	16	19	35
July 20-23	56 - Pavlof Bay	T	30	39	69	26	29	55
Total			540	517	1,057	282	279	561
1956								
June 18-22	57 - Cape Lutke	PS	26	14	40	25	12	37
June 23	58 - East Anchor Cove-Ikatan Bay	T	76	70	146	39	35	74
June 25	59 - Cape Lutke	PS	55	63	118	38	39	77
June 28-29	60 - Izembek Bay	BS	102	59	161	56	54	110
June 30	61 - East Anchor Cove-Ikatan Bay	PS	98	80	178	36	40	76
July 3-5	62 - East Anchor Cove-Ikatan Bay	T	124	144	268	61	64	125
July 9-13	63 - Izembek Bay	BS	438	305	743	157	156	313
July 16	64 - Izembek Bay	BS	97	96	193	37	40	77
July 17	65 - Izembek Bay	BS	17	18	35	15	17	32

Table A-1. --Particulars of measurements and scale samples of chum salmon taken in Alaska Peninsula commercial catch, 1951-57 -- Continued
(BS = Beach Seine, PS = Purse Seine, T = Trap, GN = Gill Net)

Date	Sample number and location	Gear used	Number of measurements			Number of scales		
			Male	Female	Total	Male	Female	Total
1956 continued								
July 18	66 - Izembek Bay	BS	79	64	143	40	40	80
July 19	67 - Izembek Bay	BS	47	45	92	39	39	78
July 19	68 - Pavlof Bay	T	20	19	39	18	18	36
July 20	69 - Izembek Bay	BS	56	44	100	39	38	77
July 23	70 - Izembek Bay	BS	70	68	138	37	40	77
July 24	71 - Izembek Bay	BS	61	70	131	40	38	78
July 27	72 - Pavlof Bay	T	56	46	102	40	38	78
July 30	73 - Pavlof Bay	T	82	86	168	39	39	78
July 30	74 - Izembek Bay	BS	37	48	85	36	40	76
Total			1,541	1,339	2,880	792	787	1,579
1957								
June 20-21	75 - Cape Lutke	PS	43	60	103	34	51	85
June 21-22	76 - East Anchor-Ikatan Bay	GN and T	119	76	195	53	36	89
June 30	77 - Ivanof Bay	PS	129	47	176	37	35	72
July 3 -9	78 - Izembek Bay	BS	111	85	196	58	57	115
July 8 and 12	79 - St. Catherine Cove	BS	197	211	408	79	74	153
July 16-17	80 - Izembek Bay	BS	100	84	184	39	39	78
July 25	81 - East Anchor Cove-Ikatan Bay	T	101	80	181	39	36	75
Total			800	643	1,443	339	328	667

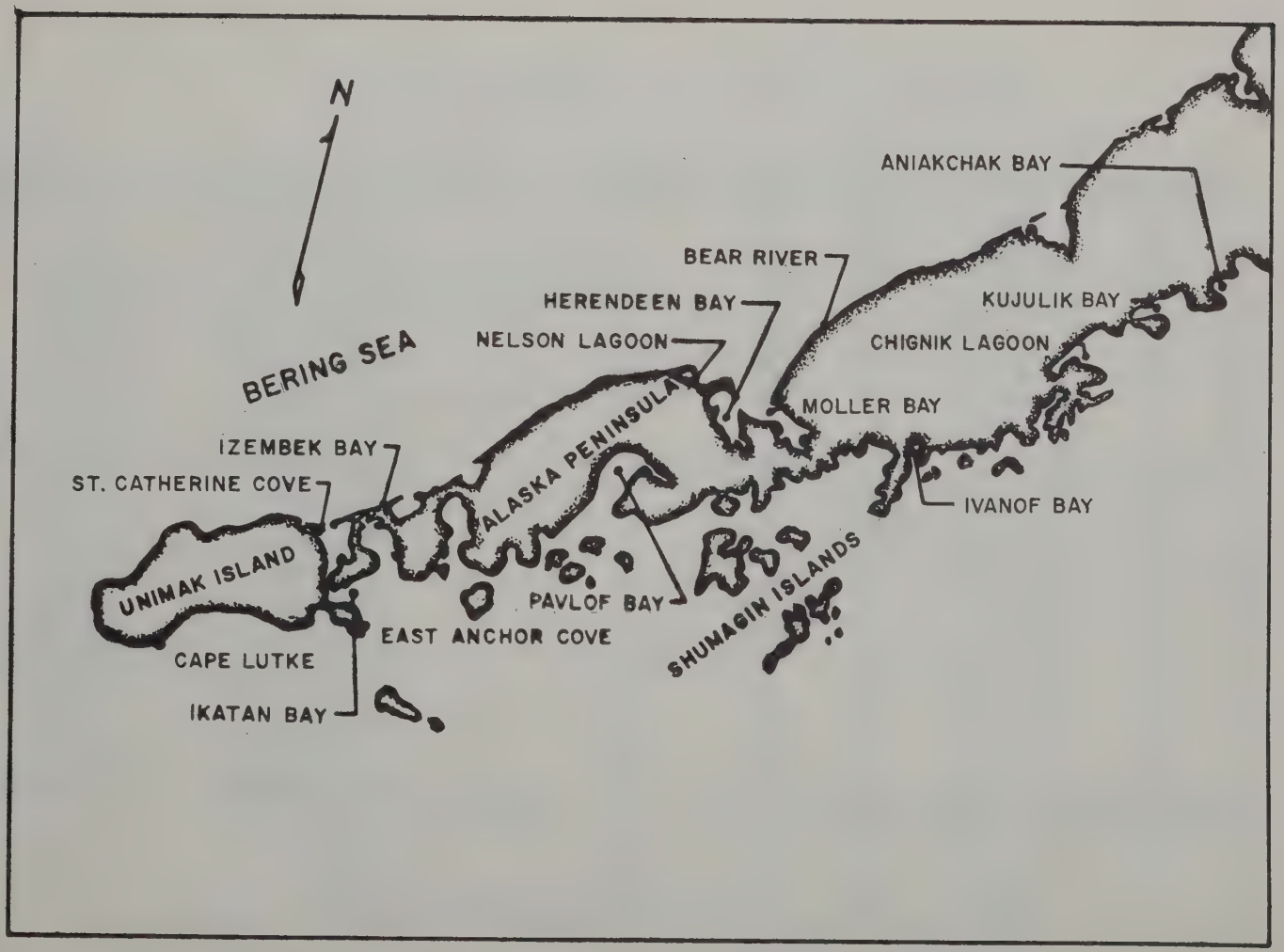


Figure A-1.--Localities where chum salmon samples were taken in the Alaska Peninsula commercial catch, 1951-57.

Table A-2. --Length frequencies of Alaska Peninsula chum salmon by age (in years) and sex, 1951-57

Length by centimeter groups (mm.)	Sample No. 1 Cape Lutke June 20, 1951						Sample No. 2 East Anchor Cove-Ikatan Bay July 10 and 14, 1951						Sample No. 3 East Anchor Cove-Ikatan Bay July 17 and 20, 1951						Sample No. 4 Shumagin Islands July 27-30, 1951						Sample No. 5 Shumagin Islands July 19, 1952					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505	1												1				2													
515													1	1		1										1				
525					1	1		2		1						1														
535							1	1					1												1	1				
545							1			1	1	1		1			3									2				
555					2			3					1	1					2				1							
565		1					1	4	1		3	1	1	1						1				1	1			2		
575						1					4	2		1			2					1	1							
585					1		1	1	1	1	4	1		1			3			3			2	1	1			3		
595					1	1	2	2		1		1									1		1	1	2			2	1	2	
605		2						4			2	1			1		2			3			1	1	1	1		2		
615			1											1						1			2	1	1			4		
625		1						1	1			2		1				2		1			2	2		2	1	2		
635			1					1												1	2							2		
645			1						2					1	1										1					
655											1			1																
665											1									1							1			
675											1																	2		
685																					2									
695																					1					1				
705																														
715																														
725																														
735																														
745																														
755																														
500																														
759																														
Total	1	4	3	0	5	3	6	19	5	4	17	9	5	10	2	2	12	2	2	11	6	1	9	6	8	8	2	1	19	0

Table A-2. --Length frequencies of Alaska Peninsula chum salmon by age (in years) and sex, 1951-57 - Continued

Length by centimeter groups (mm.)	Sample No. 6 Shumagin Islands July 21, 1952						Sample No. 7 Shumagin Islands July 22, 1952						Sample No. 8 Shumagin Islands July 24, 1952						Sample No. 9 Shumagin Islands July 25, 1952						Sample No. 10 Cape Lutke June 8-14, 1953					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505							1												2											
515	2												3			1			2			1							1	
525								1					2									1								
535	1			2			1						1			1									1				2	
545	4			2			1			2									1				1			2			4	
555	2	1		2	4		1			1						2			2				1		1	3			4	
565	2			2	1	1	1	2									1									1			3	1
575	2				3					1			1	1		1	3		1	2						1			3	
585	1			2	5		1		1	2							3		1				3			2			2	1
595		1			2		1	1		3			3	1			1		1			1	1			4				1
605	1	4		1	4								1	1			2	1					3			2				
615		1			1	1	1	1		1	2			2			1	1	1				2			1				
625		3			1		1	2		1				1						1			2						1	
635	1	4			1		1	1		2				1			1						2	1						
645		4	2		1	1					2									1			1			1				
655			2					1												1										
665										1				1																1
675						1		1												1										
685										1																				
695															1															
705																														
715																														
725																														
735																														
745																														
755																														
500																														
759																														
Total	16	18	4	11	23	4	12	10	1	0	15	4	11	8	1	5	12	2	11	6	0	3	16	1	2	17	0	0	16	4

Table A-2. --Length frequencies of Alaska Peninsula chum salmon by age (in years) and sex, 1951-57 - Continued

Length by centimeter groups (mm.)	Sample No. 11 Cape Lutke June 15 and 17, 1953						Sample No. 12 Cape Lutke June 20, 1953						Sample No. 13 East Anchor Cove-Ikatan Bay June 20, 1953						Sample No. 14 East Anchor Cove-Ikatan Bay June 22, 1953						Sample No. 15 Chignik Bay June 29-30, 1953					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505																														
515																			1											
525				1							2	1											2							
535					1		2			1	1		2				4		1											
545					2			1			1						1								1					
555					2		1	1			2						4						4		1			4		
565		1			2		1				6			1						2	1		1		2			4		
575		4	1		4	1		2	1		1	2					2	1					1					2		
585		2			3			2	1					2			3						1		7			6		
595		3			2			1						3			1	1		1				1	4			4		
605		1	2			2		1						1	1		1	1		3			1		4			5		
615		1			2			1						2	1					2					6			3		
625			1						1					1										1	2			2		
635						1		1						1									2	1	2			2		
645		2	1						1						1									2	1			1		
655			1																	1	1									
665								1												1	1				2			1		
675					1																									
685																														
695																														
705																														
715																														
725																														
735																														
745																														
755																														
500																						1								
759																														
Total	0	14	6	1	19	4	4	11	4	1	13	3	2	11	3	0	16	3	2	10	3	1	12	5	32	0	0	34	0	0

Table A-2. --Length frequencies of Alaska Peninsula chum salmon by age (in years) and sex, 1951-57 - Continued

Length by centimeter groups (mm.)	Sample No. 16 East Anchor Cove-Ikatan Bay June 30, 1953						Sample No. 17 East Anchor Cove-Ikatan Bay July 2, 1953						Sample No. 18 Shumagin Islands July 7 and 10, 1953						Sample No. 19 Shumagin Islands July 17, 1953						Sample No. 20 Shumagin Islands July 21, 1953					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505				1																										
515																1														
525				1							2						1						1							
535						1		1			1					1			1											
545	1				4						1		2	1			1						1		1					
555								2				1		1			3									1			2	
565	1	1			1			2		1	2			3			3		2			1								
575		2			4	2					1			3	1		5			2	1		1			3			2	
585		2			1		1	5			2			2			6	1		1			1	1					2	
595		2			1			1						1			4	1		1			3		1				2	
605			1					1			1	1		2	1		4						1			1			4	
615		3										1		2	1		2			3			3	1		2			5	
625								1						6			1			1			1			3			1	
635			1					1				1		1	2		1	1		1			2			3				
645			1					1						3			1			3			1	1		1			2	
655		3	1					1						1	1					2			1							
665								1				1		2	1						1									
675																														
685																										1				
695														1							1					1				
705			1																											
715																														
725																														
735																														
745																														
755																														
765																														
775										1	1																			
785																														
Total	2	13	5	2	11	3	1	17	0	2	11	5	2	29	7	2	32	3	3	14	2	1	16	3	2	16	0	0	20	0

Table A-2. --Length frequencies of Alaska Peninsula chum salmon by age (in years) and sex, 1951-57 - Continued

Length by centimeter group (mm.)	Sample No. 21 Shumagin Islands July 24, 1953						Sample No. 22 Shumagin Islands July 27, 1953						Sample No. 23 Cape Lutke June 1-20, 1954						Sample No. 24 Kujulik Bay June 18, 1954						Sample No. 25 East Anchor Cove-Ikatan Bay June 18-22, 1954					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505																												1		
515																	2													
525								1									5				1				4				4	
535	1			1										1			9				1				1				5	
545				1										4			23	1			1				1				10	
555							1							3			20			1	1				2	4			18	2
565				1	1			1			1			12			28								1	7			17	
575		1		2	3			1			2			21	2		24			1					2	8	2		12	
585		2	1		3						2			22	1		33	6		1	1		2		2	10	1		14	4
595		1			2						2	1		17	1		15	2			1				1	6	1		10	2
605		1					1	3						21	1		14	7		4			3	1	1	12	3		10	4
615		2			1			3			3	1		20	1		4	2			2			1		20	6		2	2
625					1					1		1		27	4		5	5		3	1		2	4		21	4		6	2
635		2						1			2			17	1		2	3		4	1		4	3		7	2		2	2
645		2	1		1			1						5	3					1	2		2	4		3	3		1	2
655		1	1					5			1	1		11	2		1	1		1	3		2	3		5	6			
665		3			1									1	1						2			3			5			1
675		1				1					1			3	1					1						1	1			
685														1							2		2							
695									1												1									
705														1							1		1				1			
715																					1									
725																														
735																														
745																														
755																														
500																														
759																														
Total	1	16	3	5	13	1	2	16	1	1	14	4	0	187	18	0	185	27	0	17	19	0	18	19	15	104	35	1	111	21

Table A-2. --Length frequencies of Alaska Peninsula chum salmon by age (in years) and sex, 1951-57 - Continued

Length by centimeter group (mm.)	Sample No. 26 Kujulik Bay June 22, 1954						Sample No. 27 Chignik Lagoon June 23-24, 1954						Sample No. 28 Chignik Lagoon June 25-27, 1954						Sample No. 29 Chignik Bay June 27, 1954						Sample No. 30 Kujulik Bay June 30, 1954					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505	1																													
515																														
525	1	1		1																										
535	1						1										1			1										
545													1	1								1				1				
555		1					1	1					1						1	1	1				1				1	
565		4												1						1						1				
575		7			3			4				1		1			2		1	6					1				1	
585		6	1		3	1		5			1			4			3		1	7			5	1		2			2	1
595		10	2		5	1		4			9			6	1		5						8						2	1
605		6	1		4	1		7			4			3	2		6	1		3			1			2	2		3	3
615		7	1		3	4		2			3	2	1	7	1		8	3		3			5			1	1		4	2
625		5	1		4	7		3	1		7			6			5	5		3	1		8			5	1		2	
635		1	1		2	7		3	1		8	2		5	1		5	1		6	1		6			1			1	
645		3	7		3	5		2	1		2	1		7	1		1	3		1	1		4	2		3	1		1	3
655			2		1	6		2	2					3			1	5		1			2			2	2		1	1
665			2		1	2		2						1						2	2					1	1			3
675			1			1		1	3						2			1		2	1		2	1			1		2	3
685			2											1	1						1									1
695			2			2			2						1											1	1				
705			1									1			1						2									
715																					1						2			
725																				1							1			
735																									1					
745																														
755																														
500																														
759																														
Total	3	51	24	1	29	37	2	36	10	0	34	7	3	46	11	0	37	19	3	38	11	0	42	4	2	21	13	0	20	18

Table A-2. --Length frequencies of Alaska Peninsula chum salmon by age (in years) and sex, 1951-57 - Continued

Length by centimeter group (mm.)	Sample No. 31 East Anchor Cove-Ikatan Bay July 5-9, 1954						Sample No. 32 Aniakchak Bay July 7, 1954						Sample No. 33 Herendeen Bay July 9-10, 1954						Sample No. 34 Herendeen Bay July 14, 1954						Sample No. 35 Bear River July 15, 1954					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505	1			1																										
515	1	1		2																										
525	6			5				1					1				1													
535	4	2		5	1									2											1	1				
545	8	1		7	2								2	1		1														
555	11	2		2	6								2	4			3		1						1					
565	10	6		2	5						2		3	6	2	2	2											1		
575	7	3		2	8			2			1		2	3			2		1										2	
585	10	3			11	2			2		4			6	2	1	6				1		1			2			1	1
595	5	6	1		10	1		2			4		1	16	2		16	3		2			1		1	3			2	
605	6	7	1		5	2		3	1		4		2	10	3		14	7		3	1		2	2	1	1			3	
615	2	11			6	3		2			6	1		12	3		18	12		2			2	1		1			4	1
625		7	3		10	2		5	1		3	1		9	3		15	4					1			1	1		1	1
635		15	2		5	2		3			2	2	1	8	4		10	5		2	1		2			2	2		1	
645	1	7	3		2	3		2			2	2		9	4		7	8		2			1	2		1				
655		6	1					2			1	1		3	4		2	5			1			1						1
665		3	1			1		1				1		2	4			1			1									
675			1					1	2			2		3	2					1									1	
685		3						1						1																
695			2					1						1	1															
705								1						1																
715									1			2																		
725																														
735		1																												
745																														
755																														
500																														
759																														
Total	72	84	15	26	71	16	0	27	7	0	29	12	14	97	34	4	96	45	2	12	5	0	10	6	4	12	3	1	15	4

Table A-2. --Length frequencies of Alaska Peninsula chum salmon by age (in years) and sex, 1951-57 - Continued

Length by centimeter group (mm.)	Sample No. 36 Moller Bay July 16, 1954						Sample No. 37 Bear River July 16, 1954						Sample No. 38 Nelson Lagoon July 16, 1954						Sample No. 39 Bear River July 19, 1954						Sample No. 40 Herendeen Bay July 24, 1954					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505	1																													
515																			1											
525							4	1																	1					
535							3	1		1																1				
545							2			1									1			1			1			1		
555		1					1	3	1		1		1						2					1		1			1	
565		1					5	1			1		1										1		2	2		2	1	
575			1				1	4	4		4					1							3		1					
585		2			4		5	6			10	2							2	1			1			4		1	1	
595		3			3		1	5			8	3					1		1	3			3	2	1				4	2
605		1			1			6			10	3	1				2			2			4		1	3			6	
615					1			4	1		5	2		2			4		2				1		1				3	1
625		1			2			3			11	3					1						2			3			4	
635							1	2				2		1			2			1			1		1	2			2	1
645		1						2	1		1						1			1						4	3		3	2
655									1			1		1															1	2
665					1			2	1			1			1											2	2			
675									1																	1				
685		2																												
695									1												1					1				
705																														
715																														
725																														
735																														
745																														
755																														
500																														
759																														
Total	1	12	1	0	12	0	23	40	11	2	51	17	3	4	1	1	11	0	9	8	1	1	15	4	8	25	5	4	26	8

Table A-2. --Length frequencies of Alaska Peninsula chum salmon by age (in years) and sex, 1951-57 - Continued

Length by centimeter group (mm.)	Sample No. 41 Nelson Lagoon July 25, 1954						Sample No. 42 Nelson Lagoon July 28, 1954						Sample No. 43 Cape Lutke June 14-18, 1955						Sample No. 44 East Anchor Cove-Ikatan Bay June 17-21, 1955						Sample No. 45 East Anchor Cove-Ikatan Bay June 26, 1955					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505																				1			1					1		
515													1						1										1	
525													1										1							
535																	1		2				1							
545	1						1										3						3			2			1	
555	1												1	2			4												2	
565	1						1							1			1			1			4							
575	1						5				1			1			3		1				3	1		1			2	
585		1			1					2				4			1	1		5	2		2	1		3				
595	1						1				1			1	2					1				2		1				
605	2	2			3						2	1		1	2		1	1		3				1		2				
615	1	2			6					1	2						1	1		3						1			1	
625	1	1			1		1	3		1	3			3						2										
635		1	1		4						2										1									
645		1			2			4			1			2						2	1									
655					2						1			1																
665		1			1		1	2																						
675		1																						1						
685																														
695																														
705																														
715																														
725																														
735																														
745																														
755																														
500																														
759																														
Total	9	10	1	0	20	0	10	9	0	4	13	1	3	16	4	0	15	3	4	18	4	0	15	6	0	10	0	1	7	0

Table A-2. --Length frequencies of Alaska Peninsula chum salmon by age (in years) and sex, 1951-57 - Continued

Length by centimeter group (mm.)	Sample No. 46 East Anchor Cove-Ikatan Bay June 29, 1955						Sample No. 47 Izembek Bay July 1, 1955						Sample No. 48 Izembek Bay July 5, 1955						Sample No. 49 Izembek Bay July 7, 1955						Sample No. 50 Izembek Bay July 9, 1955					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505					1																							1		
515																														
525					1		1																							
535		1																												
545		1					1	1			1						1					1	1							
555	1	1			1						1						1						3							
565		1			1						3			1									2			2			1	
575		1			1							1		2			2			1	1				1	1			3	
585		1			4	1		1			2			3			3		1	4			2						3	
595			1		1			1			2						3			2			4	1					3	
605		2	1					2			2			1	1		1	1		2			5			4			4	1
615		1			2			5	1			3		4			1	1		4									1	1
625		1						1			1			1			3			1				1		3			1	
635		1												2	1		2													
645								1	1			1		2																1
655								3				1								2	1					2				
665																														
675									1																					
685			1																											
695																														
705																														
715																														
725																														
735																														
745																														
755																														
500																														
759																														
Total	1	11	3	0	12	1	2	15	3	0	12	6	0	16	2	0	17	2	1	16	2	1	17	2	1	12	0	1	16	3

Table A-2. --Length frequencies of Alaska Peninsula chum salmon by age (in years) and sex, 1951-57 - Continued

Length by centimeter group (mm.)	Sample No. 51 Izembek Bay July 12, 1955						Sample No. 52 Izembek Bay July 13, 1955						Sample No. 53 East Anchor Cove-Ikatan Bay July 13, 1955						Sample No. 54 Izembek Bay July 16-20, 1955						Sample No. 55 Pavlof Bay July 17, 1955					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505																1									3					
515																	1		3											
525														1			1											1		
535					1						1		2				1					1	1						1	
545				1							1								2				1						4	
555					1						1												3		1				1	
565								1			2									2			3				1		3	
575		1			2			1		1	2			1			1		2	4			8				2		1	
585					1			3			2									6			5						2	
595		4			2	1		5			1	2		1			1			7			8				2		3	
605		1			3			2			3						2			2	1		8						2	1
615		5	1		3			1	1		3			2						3			3	2			1			
625		3			2			2												4	1		2				3			
635					1									1						1			2	1			2			
645		1						2												3	1		1				1			
655		3																		3										
665									1												2									
675																														
685																					1									
695		1																												
705																														
715																					1									
725																														
735																														
745																														
755																														
500																														
759																														
Total	0	19	1	1	16	1	0	17	2	1	16	2	2	6	0	1	7	0	7	35	7	1	45	3	4	12	0	1	17	1

Table A-2. --Length frequencies of Alaska Peninsula chum salmon by age (in years) and sex, 1951-57 - Continued

Length by centimeter group (mm.)	Sample No. 56 Pavlof Bay July 20-23, 1955						Sample No. 57 Cape Lutke June 18-22, 1956						Sample No. 58 East Anchor Cove-Ikatan Bay June 23, 1956						Sample No. 59 Cape Lutke June 25, 1956						Sample No. 60 Izembek Bay June 28-29, 1956					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505	2			1																					1					
515	1																2		1	1										
525																							1							
535		2						1			1						2												1	
545	1				2			1			2						6	1		2		1	8			1			1	
555	1	2		1	1						1			1			3			4			12	1		1			5	
565		1			1		1	1			2			4			2	1		4			1			4			9	
575		1			4			6	1		1			5			7			3			8	1		5			10	
585		2			6	1		3			3			10			7			4			5			10			10	1
595		1			4			2	1		2			2						6	1		1			6	1		6	
605		2			2									7				1		3	1					8				2
615		2			3			3	2					3						2						9	1		4	
625		2			1			2							2		1			1						6			1	3
635		2			1				1					2						1						3				
645		1												1	1			1			1								1	
655		1			1										1					1										
665		2																												
675																														
685																	1				1									
695																				1										
705																														
715																														
725																														
735																														
745																														
755																														
500																														
759																														
Total	5	21	0	2	26	1	1	19	5	0	12	0	0	35	4	0	31	4	1	33	4	1	36	2	1	53	2	0	48	6

Table A-2. --Length frequencies of Alaska Peninsula chum salmon by age (in years) and sex, 1951-57 - Continued

Length by centimeter group (mm.)	Sample No. 61 East Anchor Cove-Ikatan Bay June 30, 1956						Sample No. 62 East Anchor Cove-Ikatan Bay July 3-5, 1956						Sample No. 63 Izembek Bay July 9-13, 1956						Sample No. 64 Izembek Bay July 16, 1956						Sample No. 65 Izembek Bay July 17, 1956					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505							1				1			1																
515											2						1		1							1				
525				1	4			1			1															1				
535				1	3		1	2			7					1	5						1							
545		2			4			2		1	6		1	4			5			4			2						1	
555		1			2			6			3			3			14		1	3			6						2	
565	1	4			7			6			13			9		2	17			1			3			3			3	
575	1	3			7			6			9		1	17	1		23		1	5			10						4	
585		5			5			7			7			22			31			9			6			1			3	
595		4			4			8			6	1	1	23	1		24	1	1	1			5			5			2	
605		3			1			4			1	1		25	1		21			5			4			1			2	
615		6	1					9	1		2			26			6	1		2			2			1				
625		2			1			2	1		1	1		7	2		2			1			1							
635		1	1					1	1		1			5	1		1			1						1				
645														3	3					1						1				
655		1						1									1													
665																														
675								1																						
685																														
695																														
705																														
715																														
725																														
735																														
745																														
755																														
500																														
759																														
Total	2	32	2	2	38	0	2	56	3	1	60	3	3	145	9	3	151	2	4	33	0	0	40	0	0	15	0	0	17	0

Table A-2. --Length frequencies of Alaska Peninsula chum salmon by age (in years) and sex, 1951-57 - Continued

Length by centimeter group (mm.)	Sample No. 66 Izembek Bay July 18, 1956						Sample No. 67 Izembek Bay July 19, 1956						Sample No. 68 Pavlof Bay July 19, 1956						Sample No. 69 Izembek Bay July 20, 1956						Sample No. 70 Izembek Bay July 23, 1956					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505																			1			1								
515													1																	
525																							1			1			1	
535								1		1	1		1													1			1	
545		2		1	1		1				2			2						1			3		1			1	
555					6			5			2									3			2		1	1			3	
565		3		1	4		1	2			3			2			2		1	1			4			3				
575		7			4			3			12			1			3			2		1	7		1	1			3	
585		4			7	1		4			6			3			7			10			6			2			6	
595		8			6	1		6			3			1			1			9			7			9			8	
605		7			3			7			4			4			3	1		4			1			5			7	1
615		3			2			3			2			2						1			3			3	1		5	
625		1			1			1			2									2	1		1			3			2	
635		1			1	1		1			1			1						2			1			1				1
645		2	1					3										1			1					3			1	
655		1																												
665									1																					
675																														
685																														
695																														
705																														
715																														
725																														
735																														
745																														
755																														
500																														
759																														
Total	0	39	1	2	35	3	2	36	1	1	38	0	2	16	0	0	16	2	2	35	2	2	36	0	3	33	1	0	38	2

Table A-2. --Length frequencies of Alaska Peninsula chum salmon by age (in years) and sex, 1951-57 - Continued

Length by centimeter group (mm.)	Sample No. 71 Izembek Bay July 24, 1956						Sample No. 72 Pavlof Bay July 27, 1956						Sample No. 73 Pavlof Bay July 30, 1956						Sample No. 74 Izembek Bay July 30, 1956						Sample No. 75 Cape Lutke June 20-21, 1957					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505													4			1	1					1								1
515					1									1			1								1			2		
525	1	1			1								1	3		2	2			1									2	
535		1			1			1					2	5			3								1			1	5	1
545		1								2	2			2			3		2				2			2		1	4	
555	1	1			2			4			1			6			2		3				5		1	2	1		5	2
565		1			2			2			2			3			4		1				1		1	2			5	2
575	1	6			5			3			4	1		1			6			3		1	1			3			4	1
585		5			5			4			10			4			8		1	3			7	1		2	2		2	4
595	1	6			10	2		6			6			1			2			3			9			3	2			2
605		2			6			7			2			1			2			5			8				3		4	1
615		5			1	1		2			5			3			1			8			3	1		1	1			
625		3						7			1			2			1			3	1					3	2			1
635		1				1		2			1									1							1		1	
645		2						2			1									1										
655		1																												
665																														
675																														
685																														
695																														
705																														
715																														
725																														
735																														
745																														
755																														
500																														
759																														
Total	4	36	0	0	34	4	0	40	0	2	35	1	7	32	0	3	30	0	7	28	1	2	30	2	4	18	12	4	32	15

Table A-2. --Length frequencies of Alaska Peninsula chum salmon by age (in years) and sex, 1951-57 - Continued

Length by centimeter group (mm.)	Sample No. 76 East Anchor Cove-Ikatan Bay June 21-22, 1957						Sample No. 77 Ivanof Bay June 30, 1957						Sample No. 78 Izembek Bay July 3-9, 1957						Sample No. 79 St. Catherine Cove July 8 and 12, 1957						Sample No. 80 Izembek Bay July 16-17, 1957					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505																														
515																1				1		1								
525	2				1														1							1				
535	2	1			5																							1		
545		1			3	2							1	2					1	1	1		2							
555		2			6	1							1				1			3			4			1			1	
565		1			2	1		1			2			1			2		2	1			7		1	1			1	
575		3	1		4	2		1	1		1	2			1		4	1		2			6					1	6	
585		3	2		7			2	1		3	3	1	4	1		9	1	1	3	2		9	3		2			2	
595		5	3						2		2	2		5			7	3		8	2		6	2	1	4			3	1
605		4	1			1		1	1		2	3		6			9	2		9	3		4	4		4	3		5	2
615		5	2		1			2	3		1	4		5	2		1	5		3	4		9	4		3	1		3	3
625		5	1					3	3		3	2		5	4			3		6	2		3	5		3	2		1	3
635		1	1					3				1		5	1			3		6	1			3		1	2		2	1
645		3	3					1	5			1		2	4			2		4	2					2	1			
655									1			1		2	2					1	6			1		2	2			2
665			1						2			2		1	1			2		2				1		1	1			1
675									3						1															
685																	1													
695								1												1										
705																														
715																														
725																														
735																														
745																														
755																														
500																														
759																														
Total	4	34	15	0	29	7	0	15	22	0	14	21	3	38	17	1	34	22	5	51	23	1	50	23	2	25	12	2	24	13

Table A-2. --Length frequencies of Alaska Peninsula chum salmon by age (in years) and sex, 1951-57 - Continued

Length by centimeter group (mm.)	Sample No. 81 East Anchor Cove-Ikatan Bay July 25, 1957					
	Sex and age					
	Male			Female		
	3	4	5	3	4	5
505		1		1		
515						
525	1	1		1		
535				2	2	
545	1			1	2	
555		3			2	
565	1	1				
575	3	1		1	1	
585	2	2			1	
595	1	1	2		5	
605	1	3			5	
615		1			7	
625		4			4	
635		1			1	
645		3				
655		1	1			
665			1			
675						
685		1	1			
695						
705						
715						
725						
735						
745						
755						
500						
759						
Total	10	24	5	6	30	0

Table A-3. Chum salmon sex ratios, Alaska Peninsula area, 1951-57

Date	Sample number and location	Male	Female	Both
1951				
June 20	1 - Cape Lutke	87	96	183
July 10 and 14	2 - East Anchor Cove-Ikatan Bay	215	242	457
July 17 and 20	3 - East Anchor Cove-Ikatan Bay	157	201	358
July 27-30	4 - Shumagin Islands	308	245	553
Total		767	784	1,551
Percent		49.4	50.6	100.0
1952				
July 19	5 - Shumagin Islands	44	40	84
July 21	6 - Shumagin Islands	115	114	229
July 22	7 - Shumagin Islands	67	53	120
July 24	8 - Shumagin Islands	52	47	99
July 25	9 - Shumagin Islands	67	48	115
Total		345	302	647
Percent		53.3	46.7	100.0
1953				
June 8-14	10 - Cape Lutke	98	101	199
June 15 and 17	11 - Cape Lutke	38	35	73
June 20	12 - Cape Lutke	66	60	126
June 20	13 - East Anchor Cove-Ikatan Bay	81	73	154
June 22	14 - East Anchor Cove-Ikatan Bay	67	61	128
June 29-30	15 - Chignik Bay	319	172	491
June 30	16 - East Anchor Cove-Ikatan Bay	121	114	235
July 2	17 - East Anchor Cove-Ikatan Bay	108	102	210
July 7 and 10	18 - Shumagin Islands	246	215	461
July 17	19 - Shumagin Islands	117	121	238
July 21	20 - Shumagin Islands	116	87	203
July 24	21 - Shumagin Islands	122	100	222
July 27	22 - Shumagin Islands	115	121	236
Total		1,614	1,362	2,976
Percent		54.2	45.8	100.0

Table A-3. Chum salmon sex ratios, Alaska Peninsula area, 1951-57 -- Continued

Date	Sample number and location	Male	Female	Both
1954				
June 10-20	23 - Cape Lutke	226	240	466
June 18	24 - Kujulik Bay	41	41	82
June 18-22	25 - East Anchor Cove-Ikatan Bay	161	141	302
June 22	26 - Kujulik Bay	79	69	148
June 23-24	27 - Chignik Lagoon	50	40	90
June 25-27	28 - Chignik Lagoon	60	60	120
June 27	29 - Chignik Bay	60	58	118
June 30	30 - Kujulik Bay	40	40	80
July 5-9	31 - East Anchor Cove-Ikatan Bay	180	115	295
July 7	32 - Aniakchak Bay	46	44	90
July 9-10	33 - Herendeen Bay	97	98	195
July 14	34 - Herendeen Bay	20	20	40
July 15	35 - Bear River	19	21	40
July 16	36 - Moller Bay	14	13	27
July 16	37 - Bear River	80	74	154
July 16	38 - Nelson Lagoon	8	12	20
July 19	39 - Bear River	20	20	40
July 24	40 - Herendeen Bay	47	40	87
July 25	41 - Nelson Lagoon	20	20	40
July 28	42 - Nelson Lagoon	19	21	40
Total		1,287	1,187	2,474
Percent		52.0	48.0	100.0
1955				
June 14-18	43 - Cape Lutke	50	36	86
June 17-21	44 - East Anchor Cove-Ikatan Bay	39	44	83
June 26	45 - East Anchor Cove-Ikatan Bay	16	10	26
June 29	46 - East Anchor Cove-Ikatan Bay	13	15	28
July 1	47 - Izembek Bay	37	35	72
July 5	48 - Izembek Bay	54	26	80
July 7	49 - Izembek Bay	21	29	50
July 9	50 - Izembek Bay	13	22	35
July 12	51 - Izembek Bay	51	50	101
July 13	52 - Izembek Bay	44	46	90
July 13	53 - East Anchor Cove-Ikatan Bay	0	0	0
July 16-20	54 - Izembek Bay	144	143	287
July 17	55 - Pavlof Bay	28	22	50
July 20-23	56 - Pavlof Bay	30	39	69
Total		540	517	1,057
Percent		51.1	48.9	100.0

Table A-3. Chum salmon sex ratios, Alaska Peninsula area, 1951-57 -- Continued

Date	Sample number and location	Male	Female	Both
1956				
June 18-22	57 - Cape Lutke	26	14	40
June 23	58 - East Anchor Cove-Ikatan Bay	76	70	146
June 25	59 - Cape Lutke	55	63	118
June 28-29	60 - Izembek Bay	102	59	161
June 30	61 - East Anchor Cove-Ikatan Bay	98	80	178
July 3-5	62 - East Anchor Cove-Ikatan Bay	124	144	268
July 9-13	63 - Izembek Bay	438	305	743
July 16	64 - Izembek Bay	97	96	193
July 17	65 - Izembek Bay	17	18	35
July 18	66 - Izembek Bay	79	64	143
July 19	67 - Izembek Bay	47	45	92
July 19	68 - Pavlof Bay	20	19	39
July 20	69 - Izembek Bay	56	44	100
July 23	70 - Izembek Bay	70	68	138
July 24	71 - Izembek Bay	61	70	131
July 27	72 - Pavlof Bay	56	46	102
July 30	73 - Pavlof Bay	82	86	168
July 30	74 - Izembek Bay	37	48	85
Total		1,541	1,339	2,880
Percent		53.5	46.5	100.0
1957				
June 20-21	75 - Cape Lutke	43	60	103
June 21-22	76 - East Anchor Cove-Ikatan Bay	119	76	195
June 30	77 - Ivanof Bay	129	47	176
July 3-9	78 - Izembek Bay	111	85	196
July 8 and 12	79 - St. Catherine Cove	197	211	408
July 16-17	80 - Izembek Bay	100	84	184
July 25	81 - East Anchor Cove-Ikatan Bay	101	80	181
Total		800	643	1,443
Percent		55.4	44.6	100.0

APPENDIX

B. Biological Statistics for Chum Salmon, Kodiak Island area, 1948-51 and 1955-57

Table B-1. --Particulars of measurements and scale samples of chum salmon taken in Kodiak commercial catch, 1948-1951 and 1955-1957 (BS = Beach Seine, PS = Purse Seine, T = Trap, GN = Gill Net)

Date	Sample number and location	Gear used	Number of measurements			Number of scales		
			Male	Female	Total	Male	Female	Total
1948								
June 22	1 - Karluk Beach	BS	71	30	101	10	5	15
July 29	2 - Spiridon Bay	PS	101	105	206	28	27	55
August 4	3 - Uyak Bay	T	102	100	202	23	29	52
August 5	4 - Uyak Bay	T	65	68	133	26	29	55
August 7	5 - Uyak Bay	T	98	102	200	28	30	58
Total			437	405	842	115	120	235
1949								
July 7	6 - Olga and Moser Bays	GN	60	100	160	28	27	55
July 12 and 15	7 - Kaguyak Bay	PS	90	47	137	29	26	55
July 16	8 - Kiliuda Bay	PS	101	77	178	27	26	53
July 25	9 - Uganik Bay	PS	100	100	200	29	29	58
July 28	10 - Spiridon Bay	PS	99	101	200	29	24	53
July 30	11 - East Uyak Bay	T	99	101	200	23	23	46
Total			549	526	1,075	165	155	320
1950								
July 12	12 - Raspberry Island	T	50	50	100	20	18	38
August 3	13 - East Uyak Bay	T	83	100	183	20	19	39
August 8	14 - Head Uyak Bay	PS	59	51	110	18	19	37
Total			192	201	393	58	56	114

Table B-1. --Particulars of measurements and scale samples of chum salmon taken in Kodiak commercial catch, 1948-1951 and 1955-1957 -- Continued
(BS = Beach Seine, PS = Purse Seine, T = Trap, GN = Gill Net)

Date	Sample number and location	Gear used	Number of measurements			Number of scales		
			Male	Female	Total	Male	Female	Total
1951								
August 4	15 - Uganik Bay	T	62	59	121	19	18	37
Total			62	59	121	19	18	37
1955								
July 12	16 - Spiridon Bay	PS	10	41	51	10	37	47
July 14	17 - Zachar Bay	PS	52	64	116	37	34	71
July 19	18 - Spiridon Bay	PS	84	80	164	83	77	160
July 20	19 - Spiridon Bay	PS	17	24	41	16	20	36
Total			163	209	372	146	168	314
1956								
July 13	20 - Zachar Bay	PS	42	40	82	19	18	37
July 21	21 - South Uyak Bay	PS	118	93	211	19	20	39
Total			160	133	293	38	38	76
1957								
July 8	22 - South Uyak Bay	PS	33	19	52	14	16	30
July 9	23 - Zachar Bay	PS	36	23	59	36	20	56
July 9	24 - South Uyak Bay	PS	93	85	178	17	18	35
July 23	25 - South Uyak Bay	PS	91	110	201	49	47	96
July 26	26 - Spiridon Bay	PS	108	128	236	35	33	68
Total			361	365	726	151	134	285

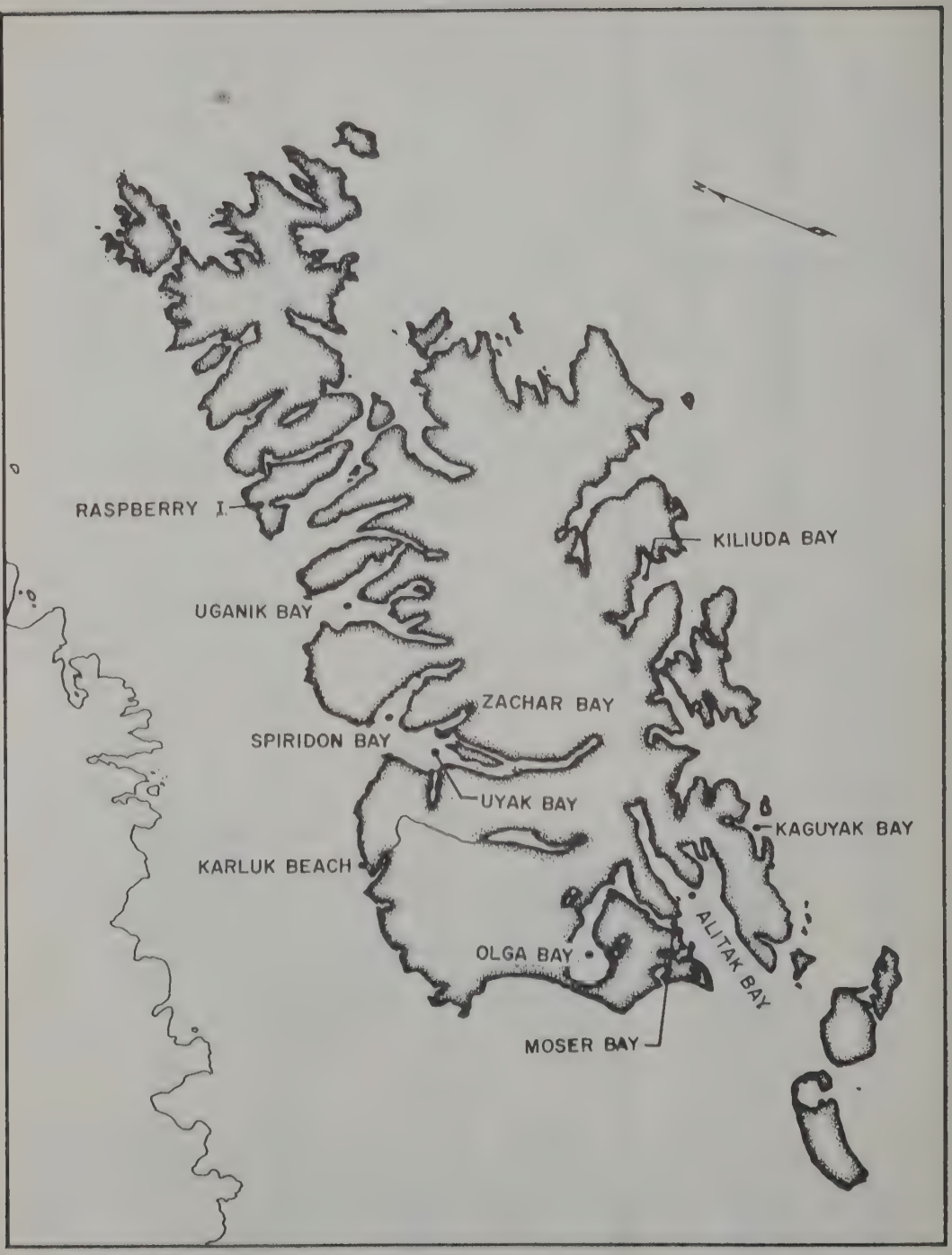


Figure B-1.--Localities where chum salmon samples were taken in Kodiak Island commercial catch, 1948-51 and 1955-57.

Table B-2. --Length frequencies of Kodiak area chum salmon by age (in years) and sex, 1948-51 and 1955-57.

Length by centimeter group (mm.)	Sample No. 1 Karluk Beach June 22, 1948						Sample No. 2 Spiridon Bay July 29, 1948						Sample No. 3 Uyak Bay August 4, 1948						Sample No. 4 Uyak Bay August 5, 1948						Sample No. 5 Uyak Bay August 7, 1948					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505																									1					
515																									1	2				
525													1													1				
535														1				1				1	1		1			1		3
545																										2				
555											1					2	2			1			1			2			1	
565		2									1			2			1			2			3		2	2		1	2	
575					1								1	2			3	1		2			2			1	1		3	
585					1		2				1			2			3	1		1	1		1			1	1	1	3	
595		1			3			1			2		2			1	4			4			2	2		2			3	
605		1	1					2				1			1		5	2		1	2	1	1	2		3			2	
615								2			3		2	1						2	2		1	2			1		3	1
625							1	1			2			2									1	4					1	1
635		1						1	1			2		1				1		1	4			2					1	1
645								4	1		1	5		1				2								1				
655		1	2					1	3		2	3									2			1			1			
665			1					2	2															1						
675												3			2															
685									2						1						1									
695																														
705															1															
715									1																					
725																													1	
735									1																					
745																														
755																														
500																			1											
759																														
Total	0	6	4	0	5	0	3	14	11	0	13	14	6	12	5	3	18	8	0	14	12	2	13	14	6	17	4	3	20	6

Table B-2. --Length frequencies of Kodiak area chum salmon by age (in years) and sex, 1948-51 and 1955-57 --Continued

Length by centimeter group (mm.)	Sample No. 6 Olga and Moser Bays July 7, 1949						Sample No. 7 Kaguyak Bay July 12 and 15, 1949						Sample No. 8 Kiliuda Bay July 16, 1949						Sample No. 9 Mush Bay July 25, 1949						Sample No. 10 Spiridon Bay July 28, 1949					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505																			1											
515																	1					1	1							
525					1																	1							1	
535											1																			1
545		1			1			2						1			1						4		1					1
555		2			1						1						3			1			2			2				
565		1		1	3			1			5			1			1						1						1	2
575		5			4			2	1		2			2	2		5			1			2			1			1	
585		4	2		5			3	1		3	1		3	1								3	1					2	2
595		4			5			4	1		3	1		3	2		3	2		2			3	1		1				
605			2		1	1		3	1		2	1		1	1		2			3			2	1		1			2	2
615		1			2			2	1		3			2	1		3	2		5			1	1					1	
625		1	1		2			1				1		1	1		3			1			4	2		1	2		2	1
635		3						2	1						1						2						3			1
645									1					1	2					4				1		3	1			2
655																				2							6			1
665		1						2			1									1	1						2		2	
675																					2									1
685															1												1			
695																					1						2			
705																											1			
715																														
725																											1			
735																														
745																														
755																														
500																			2			1								
759																														
Total	0	23	5	1	25	1	0	22	7	0	21	4	0	15	12	0	22	4	3	20	6	3	20	6	1	9	19	0	10	14

Table B-2. --Length frequencies of Kodiak area chum salmon by age (in years) and sex, 1948-51 and 1955-57 --Continued

Length by centimeter group (mm.)	Sample No. 11 East Uyak Bay July 30, 1949						Sample No. 12 Raspberry Island July 15, 1950						Sample No. 13 Uyak Bay August 3, 1950						Sample No. 14 Uyak Bay August 8, 1950						Sample No. 15 Uganik Bay August 4, 1951					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505																														
515																														
525																														
535													1								1									
545																2			1											
555					1			1									1				1						1			1
565		1			2						1						1				2									
575		1	1		1	2		1			1			1			1			3			2					1		
585			3		3			2			2						1			1										
595		2	1		2	1		2				1			1		2				3			1	2				2	
605		1	1		1						1			1			4	1		2						1			1	
615			1			6		1			3	1		3	2							1	1				1			1
625		1	1								1	3		2						2	1		3			1		1	2	
635		1	2			2		2	1			2		1			1	4		2	1		2	2				2	2	
645		2	2		1			1	1		1			3				1			1					3	1			2
655			1						2			1			1						1						1			
665								1						3	1								1			1			1		
675		1						1	1												1					2	1			
685					1																1					1				
695								1																						
705									1																					
715									1																	1	1			
725																														
735																														
745																														
755																														
500																														
759																														
Total	0	10	13	0	12	11	0	13	7	0	10	8	1	14	5	2	11	6	0	11	6	0	16	3	1	11	7	1	4	11

Table B-2. --Length frequencies of Kodiak area chum salmon by age (in years) and sex, 1948-51 and 1955-57 --Continued

Length by centimeter group (mm.)	Sample No. 16 Spiridon Bay July 12, 1955						Sample No. 17 Zachar Bay July 14, 1955						Sample No. 18 Spiridon Bay July 19, 1955						Sample No. 19 Spiridon Bay July 20, 1955						Sample No. 20 Zachar Bay July 13, 1956					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505																														
515																														
525																														
535													1																	
545																									1					
555													2													1				
565																										1			1	
575							1					1					1						1			1				
585					2							1					1									1			3	
595		2				1											2						1			3				
605						1					3	1		3			2						1			2			2	
615					2	3		2	1		1	1		3			6	1		1						2			10	
625					3			1			1	3		1	1		7	3					3	1		2			2	
635					3	4		1	1		4	4		3			9	2		1				2		1				
645		1			1	4		1	4		3	3		4	1		5	4		1			3	1		2				
655		1	1			3		2	1		1	2		8	6		4	6		1	1		1	1						
665		1			1	6			3					5	3		2	4		4			2	1			1			
675					1	1			3			1		4	1		3	7			1		1	1						
685						1			4			3		3	4		5	2			1						1			
695			2					1	4			1		7				1		2										
705		1							1					6	6						1									
715		1						1	1					2	2					1										
725									3					4	2															
735									1						1					1										
745																														
755																														
500																														
759																														
Total	0	7	3	0	13	24	1	9	27	0	13	21	3	53	27	0	47	30	0	12	4	0	13	7	1	16	2	0	18	0

Table B-2. --Length frequencies of Kodiak area chum salmon by age (in years) and sex, 1948-51 and 1955-57 --Continued

Length by centimeter group (mm.)	Sample No. 21 South Uyak Bay July 21, 1956						Sample No. 22 South Uyak Bay July 8, 1957						Sample No. 23 Zachar Bay July 9, 1957						Sample No. 24 South Uyak Bay July 9, 1957						Sample No. 25 South Uyak Bay July 23, 1957					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505																														
515																														
525																														
535														1																
545														1																
555		1			1						1																			
565					1									2				1		1									1	
575								1						1									2			1			5	2
585		1			1	1					2			1									2			2			3	1
595		1		1	1						1			1						3			1			2			5	1
605		4			2			1			3			6		4	1			1	1		1	3		5			5	2
615		4			4						1	1		4						1						5	1		6	2
625		2			1						1			2			2	1		1			1			5	1		6	3
635		1			1			1			2	1		3			1	4		1	1		1	1		3			4	
645		1	1					1			1			3	1			1		1	1		1	1		8	2			
655					2	1		1			2			3			1	2		1	2		1	1		5	1			
665					1			2	1					2			1									1	1			1
675								1	1					3				1			1			1			1			
685		1	1			1		1	1												1					2	2			
695		1												1																
705																														
715														1																
725									1												1									
735																														
745																														
755																														
500																														
759																														
Total	0	17	2	1	15	3	1	9	4	0	14	2	0	35	1	0	9	11	0	10	8	0	10	7	1	39	9	0	35	12

Table B-2. --Length frequencies of Kodiak area chum salmon by age (in years) and sex, 1948-51 and 1955-57 --Continued

Length by centimeter group (mm.)	Sample No. 26 Spiridon Bay July 26, 1957					
	Sex and age					
	Male			Female		
	3	4	5	3	4	5
505						
515						
525						
535						
545	1					
555						
565						
575	1					
585	1				2	
595		4			3	
605	1	1			6	
615	1	1			3	
625	1	5			5	
635		3			6	
645		3			4	
655		2				
665		3			2	
675		3	1		2	
685		2	1			
695						
705						
715						
725						
735						
745						
755						
500						
759						
Total	6	27	2	0	33	0

Table B-3. Chum salmon sex ratios for the Kodiak area, 1948-51 and 1955-57

Date	Sample number and location	Male	Female	Both
1948				
June 22	1 - Karluk Beach	70	30	100
July 29	2 - Spiridon Bay	101	73	174
August 4	3 - Uyak Bay	85	100	185
August 5	4 - Uyak Bay	64	68	132
August 7	5 - Uyak Bay	65	102	167
Total		385	373	758
Percent		50.8	49.2	100.0
1949				
July 7	6 - Olga and Moser Bays	36	100	136
July 12 and 15	7 - Kaguyak Bay	90	46	136
July 16	8 - Kiliuda Bay	100	69	169
July 25	9 - Mush Bay	100	88	188
July 28	10 - Spiridon Bay	50	32	82
July 30	11 - East Uyak Bay	93	100	193
Total		469	435	904
Percent		51.9	48.1	100.0
1950				
July 15	12 - Rasberry Island	65	47	112
August 3	13 - East Uyak Bay	83	100	183
August 8	14 - Head Uyak Bay	52	66	118
Total		200	213	413
Percent		48.4	51.6	100.0
1951				
August 4	15 - Uganik Bay	62	75	137
Total		62	75	137
Percent		45.3	54.7	100.0

Table B-3. Chum salmon sex ratios
for the Kodiak area, 1948-51 and 1955-57 -- Continued

Date	Sample number and location	Male	Female	Both
1955				
July 12	16 - Spiridon Bay	10	26	36
July 14	17 - Zachar Bay	52	64	116
July 19	18 - Spiridon Bay	84	80	164
July 20	19 - Spiridon Bay	17	24	41
Total		163	194	357
Percent		45.7	54.3	100.0
1956				
July 13	20 - Zachar Bay	67	62	129
July 21	21 - South Uyak Bay	115	91	206
Total		182	153	335
Percent		54.3	45.7	100.0
1957				
July 8	22 - South Uyak Bay	35	19	54
July 9	23 - Zachar Bay	38	24	62
July 9	24 - South Uyak Bay	93	85	178
July 23	25 - South Uyak Bay	90	108	198
July 26	26 - Spiridon Bay	113	132	245
Total		369	366	735
Percent		50.2	49.8	100.0

APPENDIX

C. Biological Statistics for Chum Salmon, Prince William Sound area, 1952-58

Table C-1. --Particulars of measurements and scale samples taken in the Prince William Sound commercial fishery, 1952-1953 and 1956-1958 (BS = Beach Seine, PS = Purse Seine, T = Trap, GN = Gill Net)

Date	Sample number and location	Gear used	Number of measurements			Number of scales		
			Male	Female	Total	Male	Female	Total
1952								
August 6	1 - Montague Island	T	56	92	148	20	18	38
August 12	2 - Port Gravina - Sheep Bay	PS	82	100	182	19	20	39
August 12	3 - Unakwik - Port Fidalgo	PS	20	20	40	20	18	38
Total			158	212	370	59	56	115
1953								
July 15	4 - Montague Strait - Knight Island	T	74	101	175	20	19	39
July 21	5 - Montague Strait - Bainbridge Island	T	94	99	193	19	18	37
August 3	6 - Eshamy Bay	GN	35	50	85	19	20	39
August 5	7 - Montague Strait	T	98	100	198	20	18	38
August 5	8 - Port Chalmers - Knight Island Pass	PS	50	74	124	18	18	36
Total			351	424	775	96	93	189
1956								
June 25	9 - Galena Bay	BS	5	0	5	0	0	0
June 27	10 - Unakwik Inlet	PS	0	4	4	0	4	4
July 10	11 - Port Wells	PS	50	50	100	18	19	37
July 10-11	12 - MacLeod Harbor-Point Helen	T	50	50	100	18	16	34
July 16-17	13 - Montague Strait - Knight Island Passage	T	32	42	74	0	0	0
July 19	14 - Port Wells	PS	46	42	88	19	19	38
July 19	15 - Valdez Arm	PS	15	16	31	14	15	29

Table C-1. --Particulars of measurements and scale samples taken in the Prince William Sound commercial fishery, 1952-1953 and 1956-1958 -- Continued
(BS = Beach Seine, PS = Purse Seine, T = Trap, GN = Gill Net)

Date	Sample number and location	Gear used	Number of measurements			Number of scales		
			Male	Female	Total	Male	Female	Total
1956 continued								
July 20	16 - MacLeod Harbor	T	0	0	0	18	19	37
July 20	17 - Valdez Arm	PS	31	38	69	0	0	0
July 24	18 - Montague Strait - Knight Island Passage	T	74	74	148	18	20	38
August 2	19 - Hinchinbrook Island - Ports Gravina and Fidalgo	T	0	0	0	20	19	39
August 3	20 - New England Fish Company - Ellamar	T	50	47	97	19	20	39
August 3	21 - Valdez - Port Fidalgo	PS	48	50	98	20	20	40
August 1 - 4	22 - Granite Bay Point	T	23	20	43	20	18	38
Total			424	433	857	184	189	373
1957								
July 8	23 - Point Helen	T	53	46	99	0	0	0
July 9	24 - Point Helen	T	13	13	26	0	0	0
July 11	25 - Culross Island	PS	5	4	9	0	0	0
July 13 - 14	26 - Porcupine Point	T	25	17	42	0	0	0
July 14	27 - Point Freemantle	T	45	25	70	0	0	0
July 21	28 - Bainbridge Point	T	12	8	20	0	0	0
July 22	29 - North Twin Bay	PS	2	2	4	0	0	0
July 23	30 - Point Elrington	PS	4	7	11	0	0	0
July 26	31 - Montague Strait - Knight Island Passage	T	48	51	99	19	19	38
July 28	32 - MacLeod Harbor	T	24	27	51	0	0	0
July 31	33 - Kiniklik Point	T	6	0	6	0	0	0

Table C-1.--Particulars of measurements and scale samples taken in the Prince William Sound commercial fishery, 1952-1953 and 1956-1958 -- Continued
(BS = Beach Seine, PS = Purse Seine, T = Trap, GN = Gill Net)

Date	Sample number and location	Gear used	Number of measurements			Number of scales		
			Male	Female	Total	Male	Female	Total
1957 continued								
August 3	34 - Gravina Point	T	26	11	37	0	0	0
August 4	35 - Porcupine Point	T	61	54	115	0	0	0
August 8	36 - Point Elrington	T	13	17	30	0	0	0
August 10-11	37 - Bainbridge Point	T	15	29	44	0	0	0
August 12	38 - MacLeod Harbor	PS	2	0	2	0	0	0
August 13	39 - Zaikof Bay	BS	1	0	1	0	0	0
Total			355	311	666	19	19	38
1958								
July 6	40 - Culross Island	T	15	11	26	15	9	24
July 7	41 - Point Helen	T	10	15	25	4	5	9
July 8	42 - Point Helen	T	13	21	34	0	0	0
July 9	43 - Point Freemantle	T	11	15	26	0	0	0
July 12	44 - Johnstone Point	T	38	42	80	20	19	39
July 14	45 - Point Helen	T	23	27	50	16	18	34
July 15	46 - Point Elrington	PS	3	12	15	0	0	0
July 16	47 - Point Elrington	PS	1	0	1	0	0	0
July 20	48 - Point Freemantle	T	107	83	190	0	0	0
July 23	49 - Johnstone Point	T	37	33	70	0	0	0
July 29	50 - Kiniklik Point	PS	13	14	27	0	0	0
July 30	51 - Point Freemantle	T	34	29	63	0	0	0
August 3	52 - Johnstone Point	T	20	10	30	15	10	25
August 6	53 - Point Helen	T	9	5	14	6	4	10
August 7-8	54 - Point Elrington	PS	1	2	3	0	0	0
Total			335	319	654	76	65	141

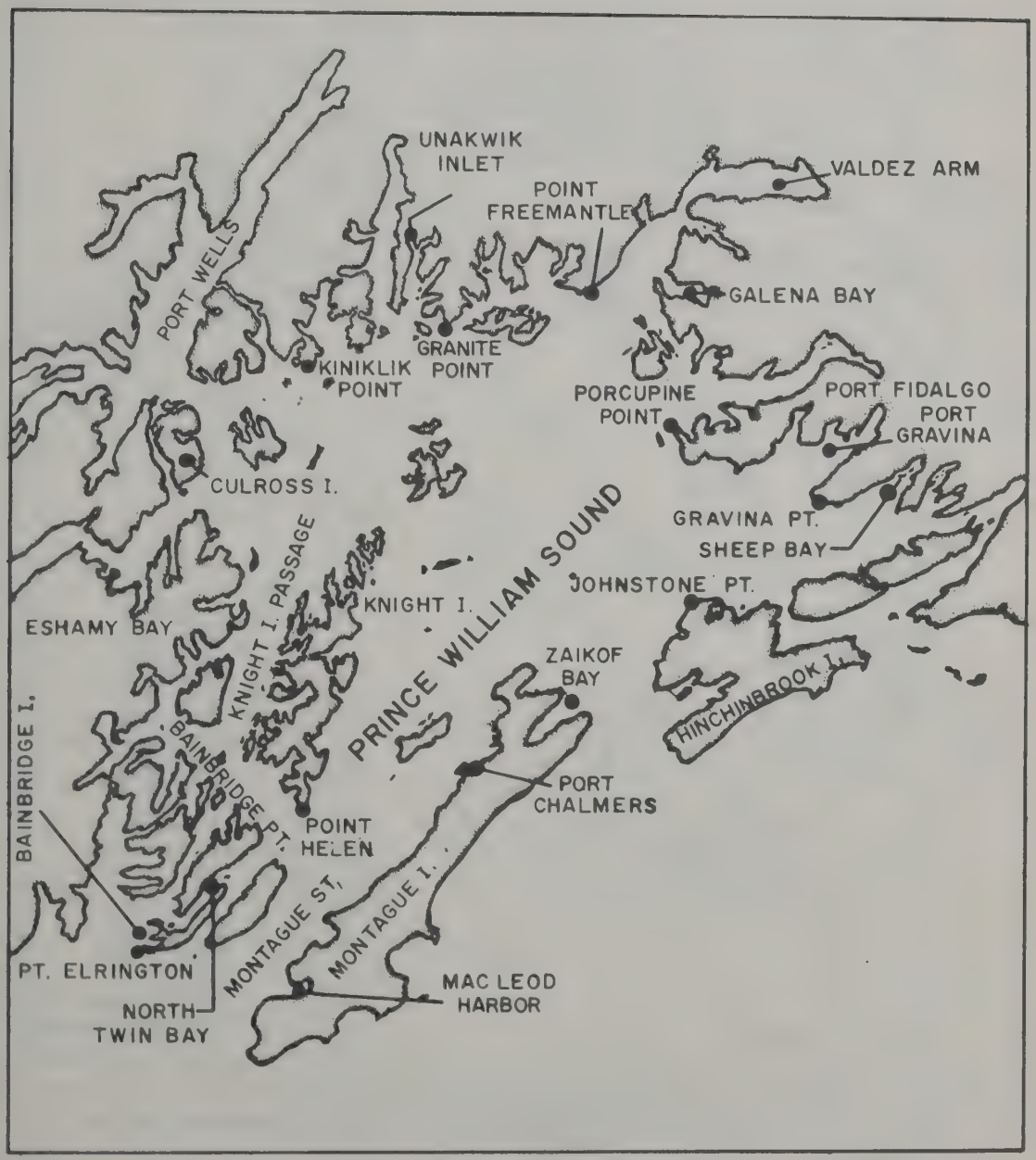
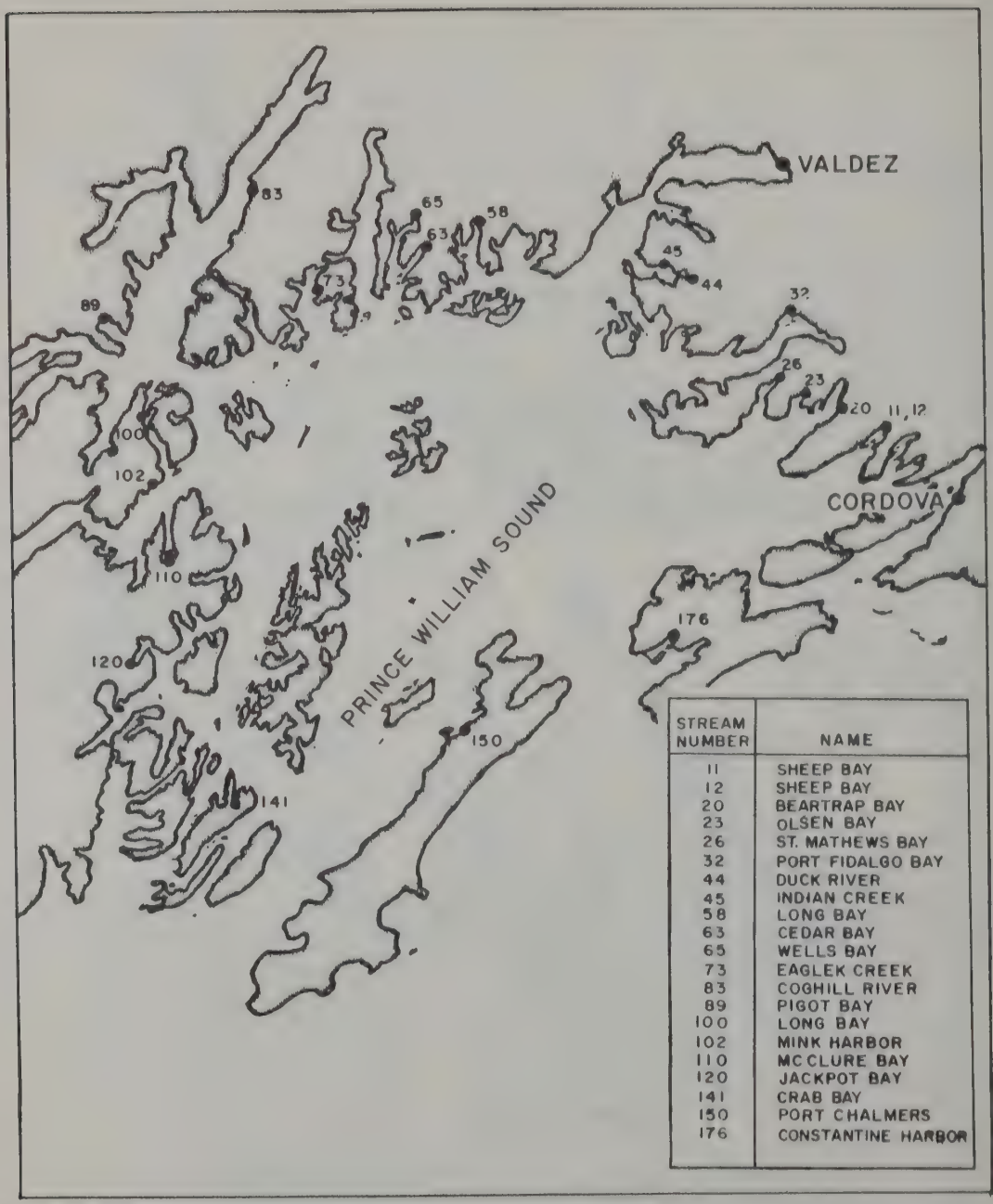


Figure C-1.--Localities in Prince William Sound where chum salmon samples were taken in the commercial catch, 1952-53 and 1956-58.



STREAM NUMBER	NAME
11	SHEEP BAY
12	SHEEP BAY
20	BEARTRAP BAY
23	OLSEN BAY
26	ST. MATHEWS BAY
32	PORT FIDALGO BAY
44	DUCK RIVER
45	INDIAN CREEK
58	LONG BAY
63	CEDAR BAY
65	WELLS BAY
73	EAGLEK CREEK
83	COGHILL RIVER
89	PIGOT BAY
100	LONG BAY
102	MINK HARBOR
110	MCCLURE BAY
120	JACKPOT BAY
141	CRAB BAY
150	PORT CHALMERS
176	CONSTANTINE HARBOR

Figure C-2.--Stream locations in Prince William Sound where chum salmon spawning ground samples were taken, 1952-57.

Table C-2. --Particulars of measurements and scale samples taken from the Prince William Sound spawning grounds, 1952-1957
(E = Early, M = Middle, L = Late run streams)

Date	Sample number and location [1/]	Timing	Number of measurements			Number of scales		
			Male	Female	Total	Male	Female	Total
1952								
August 15	1 - Sheep Bay (11)	E	10	36	46	18	19	37
August 20	2 - Duck River (44)	M	41	52	93	20	15	35
September 4	3 - Constantine Harbour (176)	M	52	45	97	0	0	0
September 11	4 - Sheep Bay (11)	E	25	19	44	0	0	0
Total			128	152	280	38	34	72
1953								
July 23	5 - Sheep Bay (11)	E	46	52	98	18	16	34
July 24	6 - Beartrap Bay (20)	E	27	38	65	18	18	36
July 25	7 - Olsen Bay (23)	E	29	34	63	17	17	34
July 27	8 - Indian Creek (45)	E	18	27	45	18	17	35
August 1	9 - Coghill River (83)	M	13	15	28	17	18	35
August 4	10 - Jackpot Bay (120)	E	40	9	49	17	8	25
August 10	11 - Olsen Bay (23)	E	24	27	51	14	19	33
August 12	12 - Constantine Harbour (176)	M	19	10	29	18	8	26
August 17	13 - Duck River (44)	M	80	44	124	16	19	35
August 17	14 - Indian Creek (45)	E	0	1	1	0	1	1
August 18	15 - East Long Bay (58)	M	4	1	5	5	1	6
August 18	16 - Cedar Bay (63)	L	2	1	3	2	1	3
August 19	17 - Wells Bay (65)	M	3	3	6	3	3	6
August 21	18 - Pigot Bay (89)	E	1	8	9	1	6	7

1/ Number in parenthesis is number assigned by Fish and Wildlife Service to identify streams

Table C-2. --Particulars of measurements and scale samples taken from the Prince William Sound spawning grounds, 1952-1957 -- Continued
(E = Early, M = Middle, L = Late run streams)

Date	Sample number and location 1/	Timing	Number of measurements			Number of scales		
			Male	Female	Total	Male	Female	Total
1953 continued								
August 21	19 - Long Bay (100)	L	49	46	95	19	17	36
August 22	20 - Mink Harbour (102)	L	1	4	5	1	4	5
August 24	21 - Jackpot Bay (120)	E	67	57	124	20	18	38
August 27	22 - South Port Chalmers (150)	L	4	2	6	4	2	6
August 28	23 - Constantine Harbour (176)	M	44	42	86	18	19	37
August 31	24 - Sheep Bay (11)	E	13	19	32	12	16	28
August 31	25 - Sheep Bay (11)	M	48	30	78	18	18	36
September 2	26 - Olsen Bay (23)	E	37	24	61	19	13	32
September 2	27 - Beartrap Bay (20)	E	54	50	104	19	17	36
September 3	28 - St. Mathews Bay (26)	M	5	2	7	4	2	6
September 3	29 - Port Fidalgo (32)	L	1	1	2	1	1	2
September 6	30 - Long Bay (58)	M	38	17	55	15	13	28
September 7	31 - Eaglek Creek (73)	M	16	8	24	16	8	24
Total			683	572	1,255	330	300	630
1954								
August 16	32 - Sheep Bay (11)	E	19	16	35	18	16	34
August 22	33 - Cedar Bay (63)	L	9	5	14	0	0	0
August 24	34 - Eaglek Creek (73)	M	87	29	116	39	27	66
Total			115	50	165	57	43	100

1/ Number in parenthesis is number assigned by Fish and Wildlife Service to identify streams.

Table C-2. --Particulars of measurements and scale samples taken from the Prince William Sound spawning grounds, 1952-1957 -- Continued
(E = Early, M = Middle, L = Late run streams)

Date	Sample number and location 1/	Timing	Number of measurements			Number of scales		
			Male	Female	Total	Male	Female	Total
1955								
August 21	35 - Crab Bay (141)	L	9	8	17	9	8	17
September 4	36 - Duck River (44)	M	33	41	74	19	19	38
Total			42	49	91	28	27	55
1956								
August 16	37 - McClure Bay (110)	M	17	21	38	15	14	29
August 18	38 - Coghill River (83)	M	53	64	117	18	18	36
August 19	39 - Eaglek Creek (73)	M	38	61	99	18	16	34
August 21	40 - Cedar Bay (63)	L	51	32	83	19	17	36
August 22	41 - Long Bay (58)	M	36	43	79	0	0	0
August 24	42 - Duck River (44)	M	38	55	93	20	18	38
August 30	43 - Sheep Bay (12)	L	59	69	128	18	17	35
August 31	44 - Beartrap Bay (20)	E	33	52	85	18	18	36
August 31	45 - Olsen Bay (23)	E	35	19	54	0	0	0
September 9	46 - Long Bay (100)	L	33	55	88	0	0	0
Total			393	471	864	126	118	244
1957								
August 15	47 - Jackpot Bay (120)	E	55	54	109	55	54	109
August 17	48 - North Pigot Bay (89N)	E	48	52	100	0	0	0
August 23	49 - Duck River (44)	M	20	22	42	20	18	38
August 25	50 - Sheep Bay (11)	E	20	20	40	17	16	33
Total			143	148	291	92	88	180

1/ Number in parenthesis is number assigned by Fish and Wildlife Service to identify streams.

Table C-3. --Length frequencies of chum salmon taken in Prince William Sound commercial fishery by age (in years) and sex, 1952-1953 and 1956-1958

Length by centimeter group (mm.)	Sample No. 1 Montague Island August 6, 1952						Sample No. 2 Port Gravina-Sheep Bay August 12, 1952						Sample No. 3 Unakwik-Port Fidalgo August 12, 1952						Sample No. 4 Montague Strait-Knight Island July 15, 1953						Sample No. 5 Montague Strait-Bainbridge Island July 21, 1953					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505																														
515																														
525																														
535																			1											
545																														
555										1	1																			
565																1			1				1							
575				1			1						1																	
585				1													1			1		1	1					1	1	
595	3									1	1					5				2		1	2		1				2	
605	1			1			1						2	1		1	1			2			3			3		1	1	
615					1		3	1		1	1	1	2			2				1			3						2	
625	3	1			1		3	1			1		1	1						2			4			4			2	
635		1			2			2			3			2			2	1		3			2	1		3	1		2	
645					3			2			1			3				1			1					2			1	
655		2			1				1		2			1				4		2						2			2	
665		2			1	1		1						1															2	1
675		1	1		2			1										1			1					1	2			
685					1				1			2		1	1					1										
695						1		1			1	1			1															
705		1	3			1		1							1					1										
715																				1										
725			1																											
735																														
745																														
755																														
<500																														
>759																														
Total	7	8	5	3	12	3	8	10	2	3	11	4	6	10	3	9	4	7	2	16	2	2	16	1	1	15	3	2	15	1

Table C-3. --Length frequencies ofchum salmon taken in Prince William Sound commercial fishery by age (in years) and sex, 1952-1953 and 1956-1958 --Continued

Length by centimeter group (mm.)	Sample No. 6 Eshamy Bay August 3, 1953						Sample No. 7 Montague Strait August 5, 1953						Sample No. 8 Port Chalmers - Knight Island Pass August 5, 1953						Sample No. 10 Unakwik Inlet June 27, 1956						Sample No. 11 Port Wells July 10, 1956					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505																														
515																														
525																														
535																														
545	1																									1			1	
555		1					1						2												1	1			2	
565					1								1			1	1												2	
575	1	1						1					1			1										5			5	
585	2	1		3	1								2				1						1			1			4	
595		2			1								2	1			3						2			3			2	
605					5		2	1			1			2		1	2						1			3				
615		3						2		1	4				2		1									1			2	
625	1	1			2			3			2		1				3									2				
635					2					1	1						2													
645					1			3			3			1			1													
655		3	1		3			2			2																			1
665		1						2			1			1																
675						1		2	1		1																			
685														1				1												
695												1		1																
705																														
715																														
725																														
735																														
745																														
755																														
<500																														
>759																														
Total	5	13	1	3	16	1	3	16	1	2	15	1	9	7	2	3	14	1	0	0	0	0	4	0	1	17	0	0	18	1

Table C-3. --Length frequencies of chum salmon taken in Prince William Sound commercial fishery by age (in years) and sex, 1952-1953 and 1956-1958 --Continued

Length by centimeter group (mm.)	Sample No. 12 MacLeod Harbor--Point Helen July 10-11, 1956						Sample No. 14 Port Wells July 19, 1956						Sample No. 15 Valdez Arm July 19, 1956						Sample No. 16 MacLeod Harbor July 20, 1956						Sample No. 18 Montague Strait-Knight Island Passage July 24, 1956					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505																														
515											1																			
525														1					1				1		1					
535																				1					1	1		1		
545		2																	2						1			1	1	
555					1						1												3							
565		1			3	1		2			3			2						1			1		2			1	2	
575		1	1		3						1			1					1	1									2	
585	1							2			4			1						1			4		1				6	
595		5			2			4			2			2		1	2						5		1	1			2	
605		1			3						3			1			4			1		1				1			3	
615		4			1			1						5			4			2			1			3			1	
625		1						2			2						1			4		1	1			3				
635					2			3			1			1			1			2			1			1				
645		1						2			1															1				
655								2																						
665																	1													
675																	1													
685																														
695																														
705									1																					
715																														
725																														
735																														
745																														
755																														
<500																			1											
>759																														
Total	1	16	1	0	15	1	0	18	1	0	19	0	0	14	0	1	14	0	5	13	0	2	17	0	7	11	0	3	17	0

Table C-3. --Length frequencies of chum salmon taken in Prince William Sound commercial fishery by age (in years) and sex, 1952-1953 and 1956-1958 --Continued

Length by centimeter group (mm.)	Sample No. 19 Hinchinbrook Island Ports Gravina & Fidalgo August 2, 1956						Sample No. 20 New England Fish Co. - Ellamar August 3, 1956						Sample No. 21 Valdez Arm - Port Fidalgo August 3, 1956						Sample No. 22 Granite Bay Point August 1-4, 1956						Sample No. 31 Montague Strait - Knight Island Pass July 26, 1957					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505																														
515	1						1																							
525																														
535	2												1						2											
545	2						1												1											
555				2	1								1						1											
565	1	1		1			3				1			1		1	1					1								
575	1	1			1		3	1			2						1			2			2							
585	2			1							1		1				1		1	2			6							
595		1			1		1	1			4			3			2			1	1		1							
605					2			2			1		3	1			4			2			3							
615	1	1			2			1			2			2						2			1		1					
625	1				3			1				1		4			1						4			1		2		
635	1				2	1		1			1			2			6			3					1	1				
645	1				2			1			4	1		1			1												1	
655								2			1						1				2				4	3			2	
665		2															1								2					
675																										1			4	
685																										1				
695		1									1															1			4	
705																										1			4	
715																														
725																													1	1
735																														
745																														
755																														
<500																											2			
>759																														
Total	13	7	0	4	14	1	9	10	0	0	18	2	6	14	0	1	19	0	5	12	3	1	17	0	8	9	2	2	16	1

Table C-3. --Length frequencies of chum salmon taken in Prince William Sound commercial fishery by age (in years) and sex, 1952-1953 and 1956-1958 --Continued

Length by centimeter group (mm.)	Sample No. 40 Culross Island July 6, 1958						Sample No. 41 Point Helen July 7, 1958						Sample No. 44 Johnstone Point July 12, 1958						Sample No. 45 Point Helen July 14, 1958						Sample No. 52 Johnstone Point August 3, 1958					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505																														
515																														
525																														
535																														
545		1														1														
555				1						1			2																	
565																			1				1							
575													1				1						1						1	
585	1	2			2											1	1									2			3	
595					1											2	1								1	1		1		
605		1	1		2				1		2		1	3			3		1				1			1				
615		2											2						1				1			2			2	
625		3			1			1						1					2							2				
635		2			1			1	1				1	2			6			2						3			3	
645		1												1						2		1	2							
655						1					2			1						1			6							
665																		1		1			2	1		2				
675		1												1			1			2			1				1			
685														2				1			1		1							
695																				1										
705																					1									
715																														
725															1															
735																														
745																														
755																														
500																														
759														1																
Total	1	13	1	1	7	1	0	2	2	1	4	0	7	12	1	4	13	2	5	9	2	1	16	1	1	13	1	1	9	0

Table C-3. --Length frequencies of chum salmon taken in Prince William Sound commercial fishery by age (in years) and sex, 1952-1953 and 1956-1958 --Continued

Length by centimeter group (mm.)	Sample No. 53 Point Helen August 6, 1958					
	Sex and age					
	Male			Female		
	3	4	5	3	4	5
505						
515						
525						
535						
545						
555						
565						
575					1	
585		1				
595		1				
605		1			1	
615		1				
625		1				
636					2	
646		1				
655						
665						
675						
685						
695						
705						
715						
725						
735						
745						
755						
<500						
>759						
Total	0	6	0	0	4	0

Table C-4. --Length frequencies of chum salmon taken from the Prince William Sound spawning grounds by age (in years) and sex, 1952-1957 --Continued

Length by centimeter group (mm.)	Sample No. 1 Sheep Bay August 15, 1952						Sample No. 2 Duck River August 20, 1952						Sample No. 5 Sheep Bay July 23, 1953						Sample No. 6 Beartrap Bay July 24, 1953						Sample No. 7 Olsen Bay July 25, 1953					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505													1																	
515																														
525																														
535																														
545																												1		
555																														
565	1																								1		1			
575	1						1															1								1
585				1										1			2													
595	1	1		1	1												2			2								1	
605		1						2						1	1			1				2				1	1		2	
615		3	1		1			1	1		3			1	1			2		1		3							2	1
625					3	2	1	2			1			2			1	1		1		1	1						1	
635		1			1			1				1			1			1		2		1				2	1			1
645	1	1			2	1		2			1	1		1	2			1		1	1		1			3			2	1
655		1				1			1						1			2		1		1	2			1	1			
665									3			2			2			1		1	1		1	1			2			
675		2	1			1			3			2								2	1								2	1
685						1						2		1	1			2			1			1						
695		1	1		1	1			2											1			1				1			1
705												1			1								1							
715												1									2									
725																														
735						1																					1			
745																										1				
755																														
500																														
759																														
Total	4	11	3	2	9	8	2	8	10	0	5	10	1	7	10	0	5	11	0	12	6	0	12	6	1	8	8	1	10	6

Table C-4. -- Length frequencies of chum salmon taken from the Prince William Sound spawning grounds by age (in years) and sex, 1952-1957 --Continued

Length by centimeter group (mm.)	Sample No. 8 Indian Creek July 27, 1953						Sample No. 9 Coghill River August 1, 1953						Sample No. 10 Jackpot Bay August 4, 1953						Sample No. 11 Olsen Bay August 10, 1953						Sample No. 12 Constantine Harbor August 12, 1953					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505																														
515	1																													
525	1																													
535																														
545																						1								
555																							1		1					
565															1															
575								1															1							
585		1			2						2															2			1	
595				1	1						2			1									2			2				
605		6	1		2						7			1	1		1						3						2	
615		1			1	1		4	1		2			1			2	1		1			1			1	1		2	
625		1			1			1			2			2			1			2			3	1		1			1	
635					2	1		2			2	1		2	1		1			2							1		1	
645		2	1		1				1						2			1		2				2		3				
655		2	1		2			1							1						1					5			1	
665					2													1						1						
675								2							2									1		1					
685								2												2			1	1						
695															2					2										
705																														
715								2												1										
725																														
735																														
745																														
755																														
500																														
759																				1										
Total	2	13	3	1	14	2	0	15	2	0	17	1	0	7	10	0	5	3	0	9	5	1	12	6	1	15	2	0	8	0

Table C-4. --Length frequencies of chum salmon taken from the Prince William Sound spawning grounds by age (in years) and sex, 1952-1957 --Continued

Length by centimeter group (mm.)	Sample No. 13 Duck River August 17, 1953						Sample No. 14 Indian Creek August 17, 1953						Sample No. 15 East Long Bay August 18, 1953						Sample No. 16 Cedar Bay August 18, 1953						Sample No. 17 Wells Bay August 19, 1953					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505																														
515																														
525											1																			
535																														
545	1																													
555																						1								
565	1																												1	
575				1																										
585	1	1	1																											
595	1				4																					1			1	
605		1																												
615		1			2																									
625						1								1																
635					3									2												1				
645		3			1									1			1			1									1	
655		1	1												1															
665		1			4																					1				
675		1				2															1									
685																														
695						1																								
705																														
715		1																												
725																														
735																														
745																														
755																														
< 500																														
> 759																														
Total	4	10	2	1	14	4	0	0	0	0	1	0	0	4	1	0	1	0	0	1	1	0	1	0	0	3	0	0	3	0

Table C-4. --Length frequencies of chum salmon taken from the Prince William Sound spawning grounds by age (in years) and sex, 1952-1957 --Continued

Length by centimeter group (mm.)	Sample No. 18 Pigot Bay August 21, 1953						Sample No. 19 Long Bay August 21, 1953						Sample No. 20 Mink Harbor August 22, 1953						Sample No. 21 Jackpot Bay August 24, 1953						Sample No. 22 South Port Chalmers August 27, 1953					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505																			1											
515																														
525																														
535					1																				1					
545																														
555																			1				1							
565											1																			
575					2						2																			
585											3						1						2							
595		1									1						1			1			1							
605					1			2									2			3			3		1					
615					2						3												5				1			
625									1		2									3	1		1							
635								2			3									5			3							
645								2			2									2			1							
655								4	2											1										
665								1	1					1						1			1			1			1	1
675								1																						
685								3												1										
695																														
705																														
715																														
725																														
735																														
745																														
755																														
500																														
759																														
Total	0	1	0	0	6	0	0	15	4	0	17	0	0	1	0	0	4	0	2	17	1	0	18	0	2	1	1	0	1	1

Table C-4. --Length frequencies of chum salmon taken from the Prince William Sound spawning grounds by age (in years) and sex, 1952-1957 --Continued

Length by centimeter group (mm.)	Sample No. 23 Constantine Harbor August 28, 1953						Sample No. 24 Sheep Bay August 31, 1953						Sample No. 25 Sheep Bay August 31, 1953						Sample No. 26 Olsen Bay Sept. 2, 1953						Sample No. 27 Beartrap Bay Sept. 2, 1953					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505																														
515	1						1																							
525													1																	
535																										1				
545																				1										
555											1											1								
565											1									2		1								
575		1			2						2																		1	
585					1						3			2					1											
595		1									3									1			1							
605		2			5						1			3			2			2			3			3			5	
615		1			2						2			2			1			1			2			2			1	
625		1			7						1			5	1		3			2			4			3				
635		1			1						1			1			1			2			1			2	1		2	
645		1						4			1						2			4	1					1			2	1
655		2						1						1			1	1		1						2	1		3	
665		2			1										1		4									2			1	
675		2						2						1				1		1										
685		2	1																							1			1	
695								2									1	1												
705								1	1																					
715																														
725																														
735																														
745																														
755																														
500																														
759																														
Total	1	16	1	0	19	0	1	10	1	0	16	0	1	15	2	0	15	3	1	17	1	2	11	0	0	17	2	0	16	1

Table C-4. --Length frequencies of chum salmon taken from the Prince William Sound spawning grounds by age (in years) and sex, 1952-1957 --Continued

Length by centimeter group (mm.)	Sample No. 28 St. Mathews Bay September 3, 1953						Sample No. 29 Port Fidalgo September 3, 1953						Sample No. 30 Long Bay September 6, 1953						Sample No. 31 Eaglek Creek September 7, 1953						Sample No. 32 Sheep Bay August 16, 1954					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505																														
515																			1											
525																														
535																			2	1										
545																			1				1							
555																			2	1		1								
565	1																		1				1							
575																			1	1			1						1	
585																1							1							
595	1															1			1											
605													2							1			1						1	
615				1												1										1				
625		2		1										2		3	1			2			1							
635														1												1				
645											1			5		2				1							1		3	1
655															1	3							1			4			3	
665								1						2												2	1		3	
675																1													1	
685															1															
695														1												1	2		1	2
705																										2	2			
715																											1			
725																														
735																														
745																														
755																														
500																														
759																														-
Total	2	2	0	0	2	0	0	1	0	0	1	0	2	11	2	0	12	1	9	7	0	1	7	0	0	11	7	0	13	3

Table C-4. --Length frequencies of chum salmon taken from the Prince William Sound spawning grounds by age (in years) and sex, 1952-1957 --Continued

Length by centimeter group (mm.)	Sample No. 34 Eaglek Creek August 24, 1954						Sample No. 35 Crab Bay August 21, 1955						Sample No. 36 Duck River September 4, 1955						Sample No. 37 McClure Bay August 16, 1956						Sample No. 38 Coghill River August 18, 1956					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505	1																													
515					1																									
525	3																													
535	1																													
545	2			2																										
555	2			2	1								1								1				1	1				
565	5			3									1						1		3						1			
575	5	1		2						1			1	1					1		2								2	
585	2			2	1						1		1	1					1		4					1			3	
595	4	2		2	1									3			1		2		2					1			4	
605		1		1	3											1	2		2						1	2				
615	4			1	2			1			1	1		1			3		5		1					2			2	
625		2			1			2			1			1			3		2		1					3			3	
635					1						1			1	1		3												1	
645		1			1									2			3		1							1	1		2	
655								1			1			1			2													
665		1										1		2												2	1			
675								2	1																	1				
685								1									1													
695								1						1																
705																														
715		1																												
725																														
735																														
745																														
755																														
300																														
759																														
Total	30	9	0	15	12	0	0	8	1	1	5	2	4	14	1	1	18	0	0	15	0	0	14	0	2	14	2	1	17	0

Table C-4--. Length frequencies of chum salmon taken from the Prince William Sound spawning grounds by age (in years) and sex, 1952-1957 --Continued

Length by centimeter group (mm.)	Sample No. 39 Eaglek Creek August 19, 1956						Sample No. 40 Cedar Bay August 21, 1956						Sample No. 42 Duck River August 24, 1956						Sample No. 43 Sheep Bay August 30, 1956						Sample No. 44 Beartrap Bay August 30, 1956					
	Sex and age																													
	Male			Female			Male			Female			Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505																			1											
515		2									1																			
525	1	1																					1							
535													1																	
545		1			1			5					1				2													
555		2			1						2						1						1			1				
565		1	1		3			3			1			1															1	
575		1			2			2			1			2			1			1			1						3	
585		2			2						6		1	4						1			2			1				
595		3			3			2			2			2			1									2			5	
605		2			2			2			1			6			3		3	1	1	4			2			4		
615					2			1			2						2		2	1		2			3			2		
625		1						1			1						1		4			1			4					
635								2						2			2		2						2					
645								1									2								2					1
655																						1						2		
665																	2		1			2			1					
675																	1			1										
685																														
695																														
705																						1								
715																														
725																														
735																														
745																														
755																														
500																														
759																														
Total	1	16	1	0	16	0	0	19	0	0	17	0	3	17	0	0	18	0	1	14	3	1	16	0	0	18	0	0	17	1

Table C-4. --Length frequencies of chum salmon taken from the Prince William Sound spawning grounds by age (in years) and sex, 1952-1957 --Continued

Length by centimeter group (mm.)	Sample No. 47 Jackpot Bay August 15, 1957						Sample No. 49 Duck River August 23, 1957						Sample No. 50 Sheep Bay August 25, 1957					
	Sex and age																	
	Male			Female			Male			Female			Male			Female		
	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
505																		
515																		
525																		
535																		
545		1						1										
555		1			1													
565		1			3		2											
575		2			7		1						1		1		1	
585		3			6	1				1							1	
595		4			9	1												
605		4	2		8			1			1			2	1		1	1
615		5	2		6	1		3			2			2				1
625		5	2		3	2		2	1		3			1	1			1
635		14	1		2			3	1		2			1			1	1
645		1			1	1		3						2				1
655		2	2					1			1	3		1	1			2
665						2					3			1	1			2
675														1				2
685			3						1		1							
695																	1	
705																		
715												1						
725																		
735																		
745																		
755																		
< 500																		
> 759																		
Total	0	43	12	0	46	8	3	14	3	1	13	4	1	11	5	0	5	11

Table C-5. Chum salmon sex ratios for the Prince William Sound area commercial catch, 1952-53 and 1956-58

Date	Sample number and location	Male	Female	Both
1952				
August 6	1 - Montague Island	56	92	148
August 12	2 - Port Gravina-Sheep Bay	82	100	182
August 12	3 - Unakwik-Port Fidalgo	20	13	33
Total		158	205	363
Percent		43.5	56.5	100.0
1953				
July 15	4 - Montague Strait-Knight Island	62	100	162
July 21	5 - Montague Strait-Bainbridge Island	70	99	169
August 3	6 - Eshamy	22	50	72
August 5	7 - Montague Strait	61	100	161
August 5	8 - Port Chalmers-Knight Island Passage	44	74	118
Total		259	423	682
Percent		38.0	62.0	100.0
1956				
June 25	9 - Galena Bay	5	0	5
June 27	10 - Unakwik Inlet	0	4	4
July 10	11 - Port Wells	50	39	89
July 10-11	12 - MacLeod Harbor-Point Helen	50	39	89
July 16-17	13 - Montague Strait-Knight Island Passage	30	42	72
July 19	14 - Port Wells	50	45	95
July 19	15 - Valdez Arm	15	16	31
July 20	16 - MacLeod Harbor	42	50	92
July 20	17 - Valdez Arm	29	38	67
July 24	18 - Montague Strait-Knight Island Passage	23	50	73
August 2	19 - Hinchinbrook Island-Ports Gravina and Fidalgo	50	42	92
August 3	20 - New England Fish Co.-Ellamar	46	50	96
August 3	21 - Valdez-Port Fidalgo	22	20	42
August 1-4	22 - Granite Bay Point	23	20	43
Total		435	455	890
Percent		48.9	51.1	100.0

Table C-5. Chum salmon sex ratios for the Prince William Sound area commercial catch, 1952-53 and 1956-58 -- Continued

Date	Sample number and location	Male	Female	Both
1957				
July 8	23 - Point Helen	53	46	99
July 9	24 - Point Helen	13	13	26
July 11	25 - Culross Island	5	4	9
July 13-14	26 - Porcupine Point	25	17	42
July 14	27 - Freemantle Point	45	25	70
July 21	28 - Bainbridge Point	12	8	20
July 22	29 - North Twin Bay	2	2	4
July 23	30 - Point Elrington	4	7	11
July 26	31 - Montague Strait-Knight Island Passage	50	40	90
July 28	32 - MacLeod Harbor	24	27	51
July 31	33 - Kiniklik Point	6	0	6
August 3	34 - Gravina Point	26	11	37
August 4	35 - Porcupine Point	61	54	115
August 8	36 - Point Elrington	13	17	30
August 10-11	37 - Bainbridge Point	15	29	44
August 12	38 - MacLeod Harbor	2	0	2
August 13	39 - Zaikof Bay	1	0	1
Total		357	300	657
Percent		54.3	45.7	100.0
1958				
July 6	40 - Culross Island	15	11	26
July 7	41 - Point Helen	10	15	25
July 8	42 - Point Helen	13	21	34
July 9	43 - Point Freemantle	11	15	26
July 12	44 - Johnstone Point	38	42	80
July 14	45 - Point Helen	23	27	50
July 15	46 - Point Elrington	3	12	15
July 16	47 - Point Elrington	1	0	1
July 20	48 - Point Freemantle	107	83	190
July 23	49 - Johnstone Point	37	33	70
July 29	50 - Kiniklik Point	13	14	27
July 30	51 - Point Freemantle	34	29	63
August 3	52 - Johnstone Point	20	10	30
August 6	53 - Point Helen	9	5	14
August 7-8	54 - Point Elrington	1	2	3
Total		334	320	654
Percent		51.1	48.9	100.0

Table C-6. Chum salmon sex ratios for the Prince William Sound spawning grounds, 1952-57

Date	Sample number and location 1/	Male	Female	Both
1952				
August 15	1 - Sheep Bay (11)	10	36	46
August 20	2 - Duck River (44)	39	50	89
September 4	3 - Constantine Harbour (176)	50	13	63
September 11	4 - Sheep Bay (11)	25	19	44
Total		124	118	242
Percent		51.2	48.8	100.0
1953				
July 23	5 - Sheep Bay (11)	46	52	98
July 24	6 - Beartrap Bay (20)	27	38	65
July 25	7 - Olsen Bay (23)	30	34	64
July 27	8 - Indian Creek (45)	18	23	41
August 1	9 - Coghill River (83)	13	15	28
August 4	10 - Jackpot Bay (120)	40	9	49
August 10	11 - Olsen Bay (23)	24	27	51
August 12	12 - Constantine Harbour (176)	19	10	29
August 17	13 - Duck River (44)	80	44	124
August 17	14 - Indian Creek (45)	0	0	0
August 18	15 - East Long Bay (58)	4	1	5
August 18	16 - Cedar Bay (63)	2	1	3
August 19	17 - Wells Bay (65)	3	3	6
August 21	18 - Pigot Bay (89)	1	8	9
August 21	19 - Long Bay (100)	49	46	95
August 22	20 - Mink Harbour (102)	1	4	5
August 24	21 - Jackpot Bay (120)	67	57	124
August 27	22 - South Port Chalmers (150)	4	2	6
August 28	23 - Constantine Harbour (176)	44	42	86
August 31	24 - Sheep Bay (11)	13	19	32
August 31	25 - Sheep Bay (12)	48	30	78
September 2	26 - Olsen Bay (23)	37	24	61
September 2	27 - Beartrap Bay (20)	54	50	104
September 3	28 - St. Mathews Bay (26)	5	2	7
September 3	29 - Port Fidalgo (32)	0	0	0
September 6	30 - Long Bay (58)	38	16	54
September 7	31 - Eaglek Creek (73)	16	8	24
Total		683	565	1,248
Percent		54.7	45.3	100.0

1/ Number in parenthesis is number assigned by Fish and Wildlife Service to identify streams.

Table C-6. Chum salmon sex ratios for the Prince William Sound spawning grounds, 1952-57 -- Continued

Date	Sample number and location [1/]	Male	Female	Both
1954				
August 16	32 - Sheep Bay (11)	19	16	35
August 22	33 - Cedar Bay (63)	9	5	14
August 24	34 - Eaglek Creek (73)	87	29	116
Total		115	50	165
Percent		69.7	30.3	100.0
1955				
August 21	35 - Crab Bay (141)	9	8	17
September 4	36 - Duck River (44)	33	41	74
Total		42	49	91
Percent		46.1	53.9	100.0
1956				
August 16	37 - McClure Bay (110)	16	14	30
August 18	38 - Coghill River (83)	48	58	106
August 19	39 - Eaglek Creek (73)	40	61	101
August 21	40 - Cedar Bay (63)	50	32	82
August 22	41 - Long Bay (58)	34	45	79
August 24	42 - Duck River (44)	38	55	93
August 30	43 - Sheep Bay (12)	57	73	130
August 31	44 - Beartrap Bay (20)	20	20	40
August 31	45 - Olsen Bay (23)	35	19	54
September 9	46 - Long Bay (100)	31	58	89
Total		369	435	804
Percent		45.9	54.1	100.0
1957				
August 15	47 - Jackpot Bay (120)	59	60	119
August 17	48 - North Pigot Bay (89N)	70	62	132
August 23	49 - Duck River (44)	20	22	42
August 25	50 - Sheep Bay (11)	20	20	40
Total		169	164	333
Percent		50.7	49.3	100.0

MS #1218

GPO 931164

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